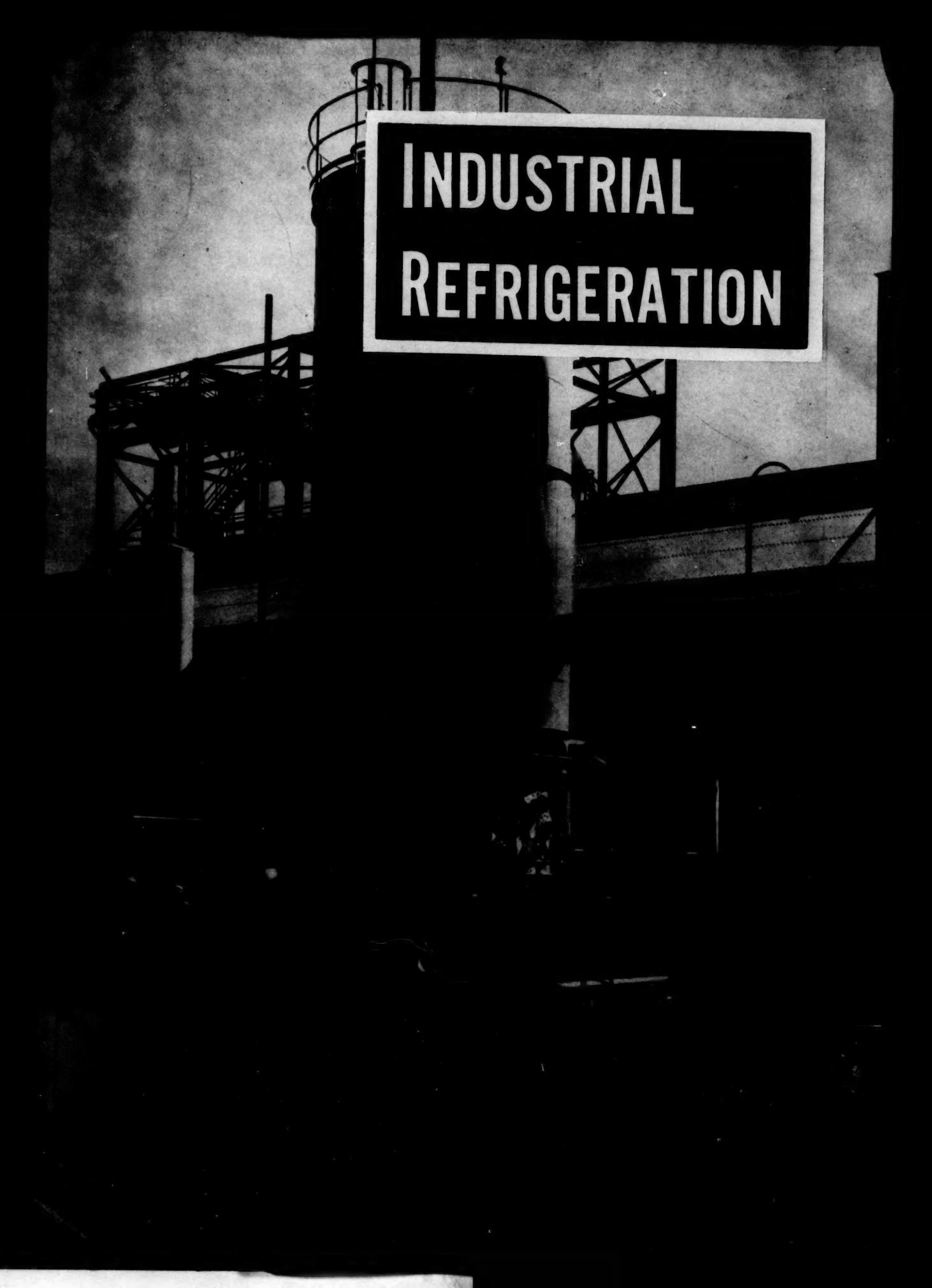
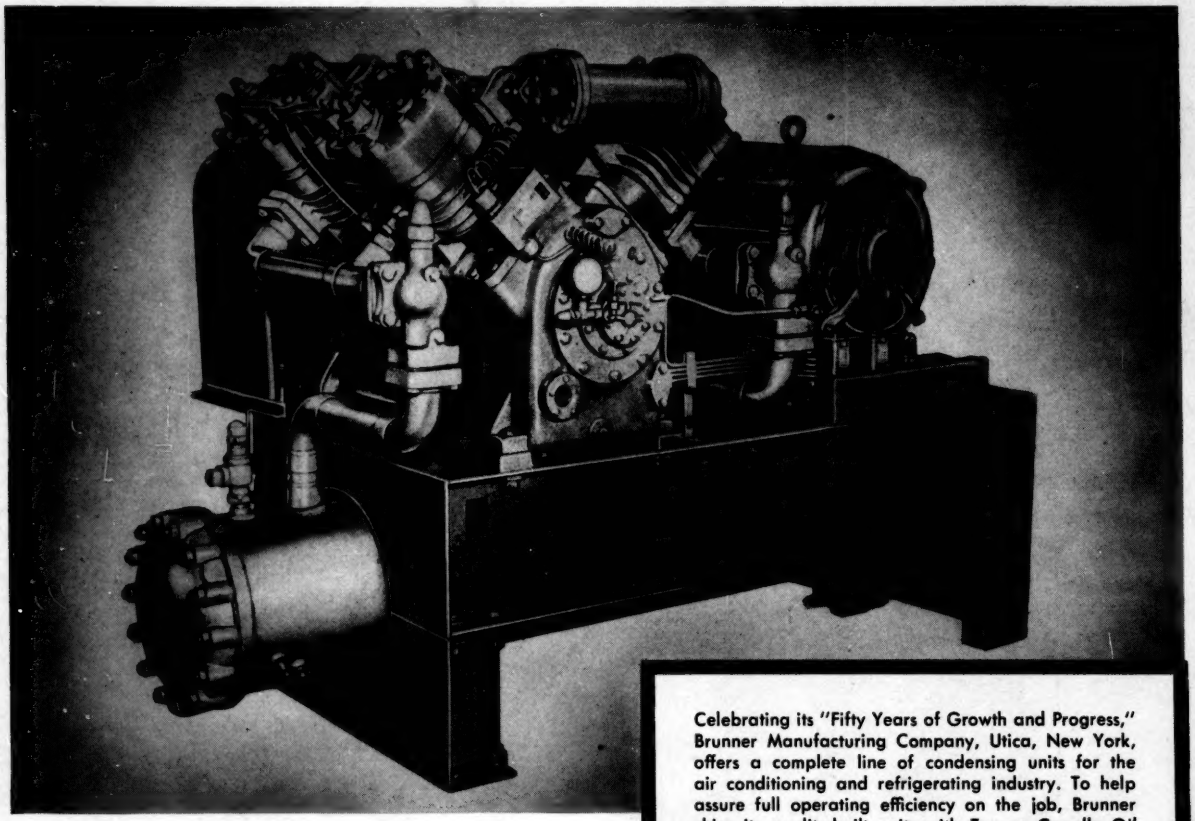

INDUSTRIAL
REFRIGERATION



Celebrating its "Fifty Years of Growth and Progress," Brunner Manufacturing Company, Utica, New York, offers a complete line of condensing units for the air conditioning and refrigerating industry. To help assure full operating efficiency on the job, Brunner ships its quality-built units with *Texaco Capella Oil, Waxfree.*

BRUNNER SINCE 1906 **chooses**

Texaco Capella Oil Waxfree

for factory-fill

Texaco Capella Oil Waxfree offers truly effective lubrication. It exceeds the requirements of the Freon floc test and the specifications of all leading manufacturers. It won't wax out in the system—not even at temperatures as low as minus 100° F. It effectively resists oxidation and retains its stability throughout an extra long service life . . . does not foam and is compatible with all refrigerants.

There is a complete line of *Texaco Capella Oils Waxfree* to meet all compressor requirements. Available in 55-gallon and 5-gallon drums, 1-gallon cans, and the more popular grades in 1-quart containers—all refinery-sealed to protect purity and quality.

A Texaco Lubrication Engineer will gladly help you select the proper ones. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.

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TEXACO Capella Oils Waxfree

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TUNE IN . . . METROPOLITAN OPERA RADIO BROADCASTS EVERY SATURDAY AFTERNOON

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Gentlemen:
Send me your new No. 60 Hardware Catalog

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Address_____

City_____ **State**_____

Armalite—new insulation for cold rooms is strong, light, and highly efficient

A brand-new, board-form insulation for cold rooms operating at temperatures as low as minus 50° F. has been developed recently by Armstrong. Called Armalite*, it's a white closed cellular material with an extremely low K-factor of 0.24 Btu-in./sq.ft.-hr.-°F. at 70° mean temperature. Armalite has a resilience or "springiness" that allows tight joint construction, and its dimensional stability in service is excellent. Light weight of only 1.25 lbs. per cubic foot means easy handling. High strength keeps edges and corners sharp and accurate. Boards are 12" x 36," in 2", 3", and 4" thicknesses.

Armalite is one of the many quality products in the full line of Armstrong Industrial Insulations. Armstrong also offers you a complete contracting service geared to install these materials economically and efficiently.

For full data on Armalite or any other Armstrong insulating material, send for free booklets. Check the ones you want on the coupon below.

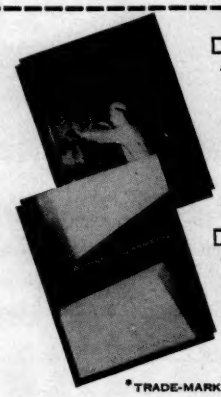
Armstrong

INDUSTRIAL INSULATIONS

for temperatures from –300° F. to 3000° F.

☐ Armstrong Armaglas** Duct Insulations

☐ Armstrong Corkboard for Low-Temperature Rooms



*TRADE-MARK

☐ Armstrong Armaglas** Insulations for Low-Temperature Rooms

☐ Armstrong Armalite, a New Foamed Plastic Insulation for Low-Temperature Rooms

Armstrong Cork Company
2103 Skye Drive
Lancaster, Penna.

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Please have an Armstrong representative call. ☐

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Company .....

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March, 1957

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Number 3

Vol. 132

J. F. NICKERSON, FOUNDER

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The Cover:

Industrial refrigeration, 1600 tons of it at minus 300 F, is a reality at Spencer Chemical Co.'s Vicksburg, Miss. plant. The nitrogen wash tower used in the final stage of hydrogen purification is pictured on the cover. Hydrogen at 300 F is brought into contact with liquefied nitrogen. Impurities in the hydrogen, such as methane and carbon monoxide, are removed in this operation. Efficiency of the process is such that only 10 parts per million of carbon monoxide remain after "washing". Read "Ultra-Low Temperatures . . ." on page 13.

What's New

MACHINERY
APPLIANCES • PROCESSES

New Degreaser Spray

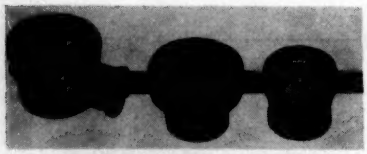
A NEW aerosol degreaser that is designed for use on all types of machinery and electrical equipment, has been introduced by Stewart-Hall Chemical Corp. Mount Vernon, N.Y. It removes grease, oil, carbon, tar, gums and similar difficult to remove substances. Simply spray Zipp on the area to be cleaned and within a minute you can either wipe the object clean with a rag, or, if not electrical, hold it under a water faucet and rinse it off.

Using Zipp on an oily surface

Zipp is excellent for cleaning motors and other electrical equipment, oily machinery, and other mobile equipment. It will remove greasy stains from painted surfaces, and concrete floors. It dries rapidly, leaving no film or vapor. It will not short electrical equipment, is non-corrosive and non-flammable, and is safe for painted surfaces. It does not contain carbon tetrachloride. Packing is 16 ounces net weight per can.

New Drophead Ratchet Pipe Threaders

TWO NEW Pipemaster drophead ratchet pipe threaders with segmental dies are announced by The Erie Tool Works, Erie, Pa. They are offered in two size ranges — No. 1 PR in all sizes from ⅛ through 1-¼-inch and No. 2 PR in all sizes from ⅛ through 2 inches. The die

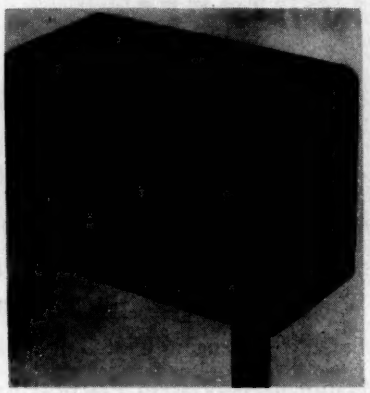


New Drophead ratchet pipe threaders made by Erie Tool Works.

heads change instantaneously yet cannot fall out. Two-way ratchet is provided for easy back-off. A handy carrier is furnished free for the 1 PR. The dropheads work equally well for hand or machine operation and are designed so that chips clear themselves. Chasers are self starting.

Temperature Controller

A NEW series of differential expansion type temperature controllers has been announced by Burling Instrument Company, East Orange, N. J. Called the Models F-1C, F-2C, and F-3C, this series includes several new features and offers modifications which permit use in an unlimited number of applications.



Model F-2C temperature controller showing set screw temperature adjustment.

These include accurate on-off temperature control of heating operations, processes, equipment, etc., safety alarms and cut-outs on similar installations, and combinations of control and alarm. The choice of one, two, or three snap-action switches on any instrument makes many unusual installations possible. Temperatures from sub-zero to 2000 F can be handled without difficulty; adjustable ranges as wide as 1200 degrees in one instrument are offered.

Operation is by the difference in expansion of two concentric tubes when exposed to heat. The resulting movement is multiplied through a lever arrangement which actuates one or more switches. Standard switch rating is 15 amp, 125-250v, AC, but higher ratings are available. All cases are weathertight and may be used in outdoor locations. Temperature adjustments are all made externally, but two styles offer choice of knob with pointer for easy adjustment and socket head set screw where tampering may be present.

New All-Purpose Coating

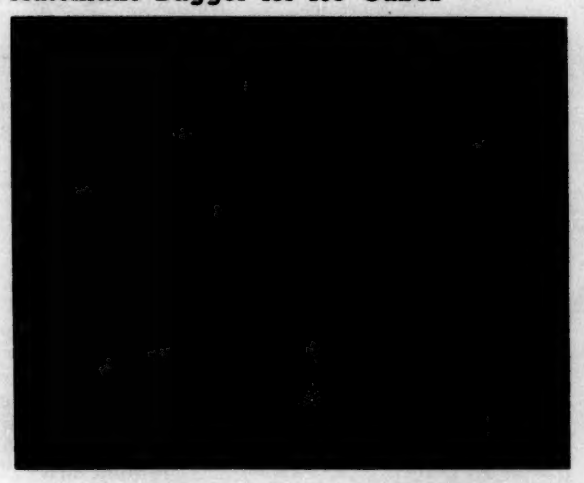
A NEW coating "Maintz", which provides protection against severe chemical and weather exposure has been introduced by The West Chester Chemical Company, West Chester, Pa. This coating is based on DuPont's chlorosulfated polyethylene which in combination with silicone and other resins produces a coating which is tough and long lasting. It does not dry to a hard and brittle finish as does ordinary paints, but forms a tough resilient coating which has resistance to abrasion, weathering, and chemical corrosion. In addition, it has sufficient elasticity to withstand extremes of expansion or contraction without cracking and retains this property at temperatures of as low as minus 40 F.

It is chemically inert and is resistant to oxidation, ozone, weathering, acids including nitric and chromic, chlorine solutions, caustic, refrigerants, alcohols, ethers, grease, and many other chemicals and solvents. This combination of chemical and weather resistance has been proven in tests where exposure to both salt spray and tropical weather for over two years have shown no measurable degradation.

It is particularly suited for protection of both buildings and equipment in refineries, chemical plants, smelters, marine service or any other locations where severe conditions present problems in maintaining a protective coating. It is manufactured in white, black and gray and can be supplied in a wide variety of pastel colors custom tinted to specification in 55-gallon drum minimum quantities.

New Automatic Bagger for Ice Cubes

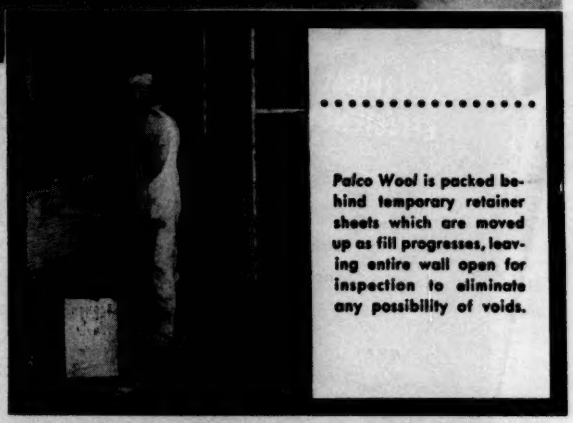
A NEW "500" Single Automatic Ice Cube Bagger has been introduced by the K. G. Brown Manufacturing Co., Mattituck, L. I., New York. On-the-job performance has shown the "500" faster, more efficient and operationally foolproof. Performance-wise—it bags ice cubes, from 5 lbs to 50 lbs, either Polyethylene or paper. An exclusive, Brown-designed "L" Conveyor, engineered to deliver peak production in sequence is also available.



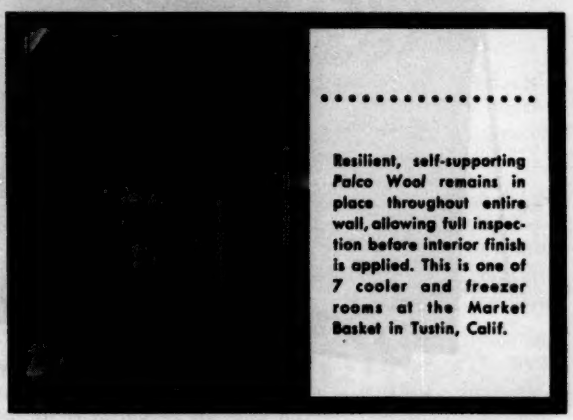
The new Brown automatic ice cube bagger.

Big super market chain switches to Void Free PALCO WOOL

This Tustin, California unit is one of approximately 10 huge Market Basket Stores recently completed, in construction or planned for the near future—each with 7 freezer and cooler rooms insulated with Void Free Palco Wool.



Palco Wool is packed behind temporary retainer sheets which are moved up as fill progresses, leaving entire wall open for inspection to eliminate any possibility of voids.



Resilient, self-supporting Palco Wool remains in place throughout entire wall, allowing full inspection before interior finish is applied. This is one of 7 cooler and freezer rooms at the Market Basket in Tustin, Calif.

5 newest markets and 5 more scheduled with Void Free PALCO WOOL Insulation in over 70 large freezer and cooler rooms

Recognized among the largest, most modern de luxe super markets in the nation, 38 Market Basket Stores have gained wide experience with many types of low temperature insulation. In all of their recent and planned installations, Market Basket now specifies *Void Free* PALCO WOOL—the Underwriters' Laboratories labelled insulation that combines all these advantages:

- No cracks
- No joints
- No convection loss
- No pockets
- No settlement
- No trapped moisture
- No shrinkage
- No leaks
- No deterioration

SEE THE NEW REFRIGERATION INSULATION MANUAL IN SWEET'S INDUSTRIAL CONSTRUCTION FILE OR SEND COUPON AT RIGHT FOR YOUR FREE COPY

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- ☐ New complete Refrigeration Insulation Manual
- ☐ Sample of Palco Wool Insulation
- ☐ In-place test data on insulated structures

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Title_____

Company_____

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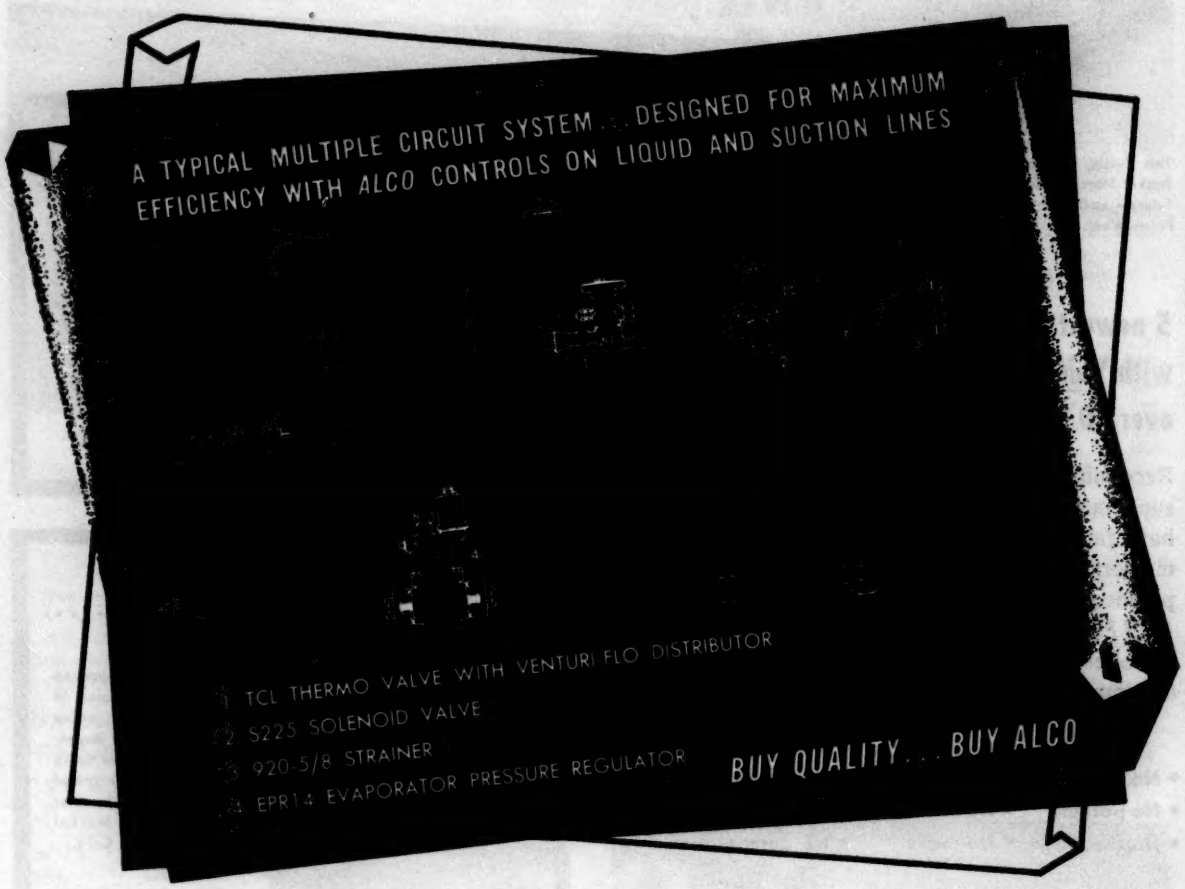
...for any refrigeration system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7042

New Sealing Feature Prevents Moisture Penetration in Cold Storage Doors

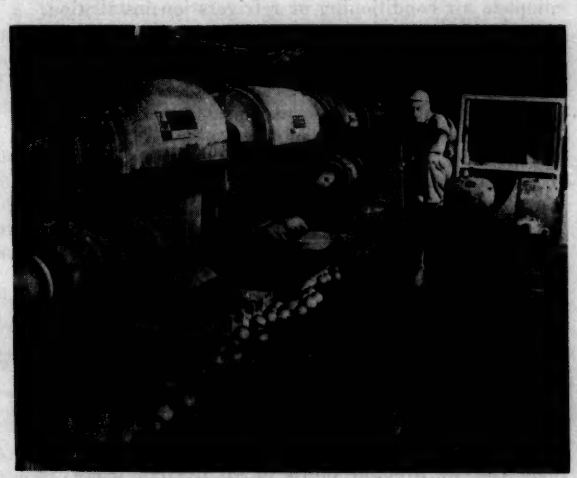
A NEW feature known as Vap-r-tyt has been introduced by the Jamison Cold Storage Door Co., Hagerstown, Md., to prevent moisture penetration into the core of cold storage doors under high vapor pressure. It consists basically of soldering all metal seams and sealing all penetrating bolts on the fronts of metal clad doors, whether the cladding covers the entire door or only part of it.

Jamison's Vap-r-tyt seal consists of soldering locked seams to prevent moisture penetration into the door

The new measure of protection is now standard with all of Jamison's low temperature doors for zero and sub-zero temperatures. It is also offered as an optional feature on any other metal clad door made by the company. Development of the new feature is intended to further assure trouble-free operation of cold storage doors.

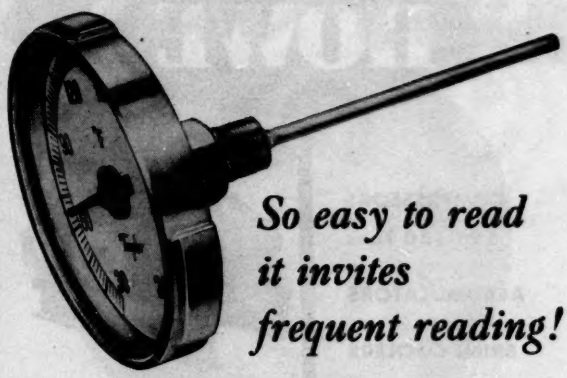
Orange Juice Extractor

AN ORANGE Juice extractor has been designed by The Food Machinery & Chemical Corp., Los Angeles, Calif., for use in supermarkets, restaurants and hotels. The Wrigley Stores of Detroit uses one of these extractors in a warehouse and averages about 3,000 gallons per week. The juice flows from the extractor to a finisher and ten to a 200-gallon cooling tank. It is cooled to 45 F and pumped to an overhead tank from which bottles are filled manually. The method used by this improved extractor eliminates the contamination from the peel also from the seeds, thus prohibiting off-flavor tastes. The equipment is sold rather than leased outright.



FMC In-Line Juice extractors at Lake Wales Concentrate, showing the feed belt

NEW TAYLOR BI-THERM* DIAL THERMOMETER



So easy to read it invites frequent reading!

A simple, dependable, and economical thermometer with many practical applications in industrial refrigeration. Wide variety of ranges from minus 40° to plus 750°F. Available with three or five inch dials, and stem lengths of 4, 6, 9, and 12 inches.

EASY TO READ: The large dials are highly readable because of black figures and graduations on an aluminum background.

RUGGED: All exposed metal parts are of arc welded, corrosion-resistant stainless steel. All instruments are waterproof. All mechanical connections are welded for greater toughness and reliability.

ACCURATE: These instruments are accurate within ±1% of range, over the entire range. Simple zero-setting features correct minor errors in readings which might result from severe mechanical shock. No ambient temperature effect. Overrange protection 50% up to 500° F.; 10% above 500°F.

VIBRATION DAMPED: All instruments, except the 200° to 750°F. range, are silicone damped against vibrations. Result is increased speed of response, minimum pointer vibration, and elimination of pointer chatter when the thermometer is handled.

ECONOMICAL: Costs only **$16** to **$26,** depending on dial size and length of stem. Ask your Taylor Field Engineer, or write for **Bulletin 98267.** Taylor Instrument Companies, Rochester, N. Y., or Toronto, Canada.

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FROM MANUFACTURER TO CONTRACTOR

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COMPRESSORS
5 to 150 Tons

ACCUMULATORS

BRINE COOLERS

FIN & PIPECOILS

CONDENSERS
Evaporators, Double Pipe Shell and Tube

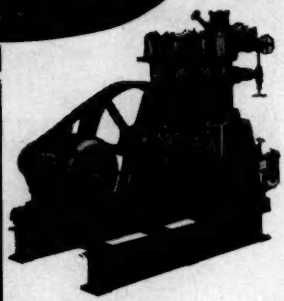
SURGE DRUMS

UNIT COOLERS

FLAKE ICE MAKERS
1 to 10 tons

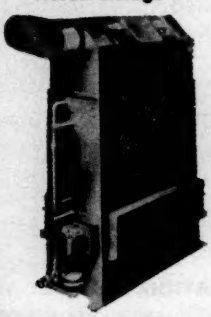
RECEIVERS

PRESSURE VESSELS
Fabricated to order



MODEL D IN SIZES
from 25 to 150-ton capacity

RAPID FREEZE UNIT COOLER
Designed for blast and freezer storage



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10-ton to 200-ton capacity

HOWE'S custom-order fabrication shop is especially set up to produce quality ammonia components that meet exact industry requirements. Pressure vessels are built to ASME code standards. Shop flexibility gives you volume quantity prices on small quantity purchases, along with deliveries that meet your schedules. Consult Howe today — no obligation.

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PRESS BRIEFS

Meat Packers Seek Release From Consent Decree

SWIFT, Armour and Cudahy have filed briefs in the Federal District Court in the District of Columbia asking for relief from restrictions imposed on them and Wilson and Company by a consent decree issued in 1920 in settlement of an antitrust suit. This decree prevents these four meat packers from:

(A) Dealing in approximately 140 food and non-food products.

(B) Using their distribution facilities (including warehouses) for handling any of these 140 items.

(C) Owning and operating retail meat markets.

(D) Dealing in fresh milk or cream.

Swift, Armour and Cudahy say they need relief from these restrictions in order to diversify their operations and increase profits. Several groups representing smaller meat packers and others in the food processing and distribution field have asked permission of the Justice Department to intervene in opposition to the large packers' motions.—NARW Quick Sheet.

Boards Approve Acquisition of Brunner by Dunham-Bush

DIRECTORS of both concerns approved an agreement for Dunham-Bush, Inc., West Hartford, to acquire the assets of Brunner Manufacturing Co., Utica, N.Y. The proposal is subject to approval by stockholders of both companies.

Under the agreement, holders of Brunner would receive one-quarter share of Dunham-Bush common and $6.00 of new non-convertible six percent, 20-year subordinated debentures of Dunham-Bush for each share of Brunner common. With each $100 par value of the new debentures, a warrant would be issued entitling the holder to buy one Dunham-Bush common share within five years from April 1, 1957, at $12 a share. Dunham-Bush also would assume all Brunner liabilities, including outstanding six percent subordinated convertible debentures.

Dunham-Bush said the acquisition of Brunner, which makes refrigeration compressors and condensing units, would enable it to sell all the equipment needed for a complete air conditioning or refrigeration installation.

New Cold Storage Plant

A NEW million-pound capacity cold storage plant is now in operation at Clarksville, Ark. Known as the Western Arkansas Cold Storage Plant, the building is situated near the Priebe and Sons Processing Plant.

Constructed of concrete blocks, the building was completed early in January and after careful testing of the machinery, the first items for commercial cold storage were placed in the plant the middle of the month. Construction began last June. When the building was within three weeks of completion, it was destroyed by an explosion and fire. As soon as possible, rebuilding got under way.

According to Omar O. White, who will serve as plant manager, the quick-freeze unit of the plant is capable of sharp freezing 48,000 pounds at a time. The quick-freeze room can be brought down to 40 degrees below zero. The local plant is the only cold storage warehouse for commercial purposes between Van Buren and Little Rock.

Atomic Coolant In Pilot Stage At Monsanto

A CHEMICAL developed by Monsanto Chemical Co., St. Louis, Mo., to replace water as a cheaper means of cooling and moderating atomic reactors is in its initial production stages according to a news report.

The fluid, isopropylbiphenyl, is being produced on a pilot plant scale by the company's organic chemicals division while full-scale production problems are studied. More costly than water, the chemical's economic advantages lie in the fact that it does not corrode metals as does water and will not vaporize nearly so readily as water, the company said.

Water cooling and moderating systems are a major cost item in today's atomic reactors since such systems must be built of expensive, corrosion-proof metals and to withstand high steam pressures. Chemical coolants such as isopropylbiphenyl may eliminate the major part of these costs, according to Monsanto's research findings.

The first reactor designed to use a chemical such as isopropylbiphenyl as a coolant-moderator now is being built for the Atomic Energy Commission at the National Reactor Testing Station, Arco, Idaho.

Morrell Acquires Two California Meat Packers

JOHN MORRELL & Co., meat packer, Ottumwa, Iowa, announced purchase of two California meat companies and a cold storage company. The concerns bought for an undisclosed amount of cash, are Holly Meat Packing Co. and Holly Cold Storage Co., Oakland, and Bob Ostrow Co. and affiliates, San Francisco.

The Holly packing plant has about 40,000 square feet of floor space and employs about 100 workers. It manufactures sausage and distributes fresh beef, pork, veal and lamb. The company will operate as Morrell-Holly Meat Packing Co., with products sold under the Holly name. The cold storage facility, with a capacity of four million pounds, will operate as Morrell-Holly Cold Storage Co.

Bob Ostrow Co., with 28,000 square feet of floor space and 115 employes, packages and distributes meat, cheese and fish products. Products will be sold under both Bob Ostrow and Morrell brand names.

Explosion Damages Ice Plant

AN EXPLOSION, believed to have been caused by an accumulation of dust, blew out a 100-foot section of a brick wall of the City Products Corp. plant in St. Louis, Mo. Deputy Fire Chief James Sauerwein estimated damage by the blast and the fire that followed at $30,000.

The explosion damaged a long one-story offset to the main structure in which there are ammonia pipes and supplies of paper bags for sacking processed ice and ice cubes. The smoldering fire ate into the cork insulation of the storage warehouse. Fireman managed to put it out at 4:30 a.m. six hours after the explosion.

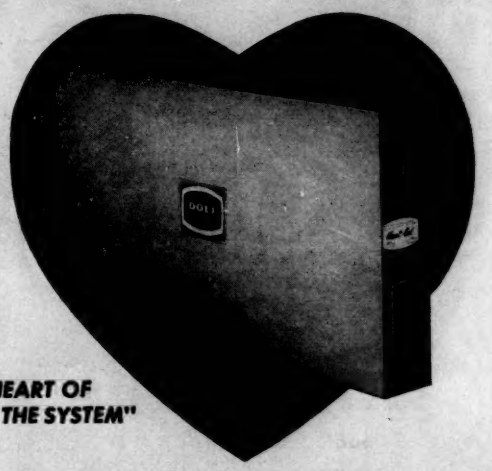
Union Electric Company crews cut power lines near the structure after telephone and electric wires had been broken by the blast.

Vending For Frozen Foods

TWO supermarkets in California are experimenting with vending machines for frozen foods. One is at Freeman's, San Leandro; the other at Nelson's, Richmond. Both are outside the store. Similar machines have been installed in apartment houses and factories in the Pacific Northwest.

DEFROST PROBLEMS?
Here's the ANSWER!...

Heat-Cel



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- Positive, consistent, economical.
- Performs efficiently in any ambient, regardless of location or season.
- Independent of compressor operating time or type (air or water cooled).
- Solution temperature automatically maintained by thermostat.
- Adjustable for individual operating conditions.
- No special controls needed for winter-time operation.
- Higher wattage elements available for extreme conditions.
- Heater replaceable in the field.
- Patented DOLE VACUUM principle insures faster heat transfer for quicker defrosting . . . convenient "plate" design allows flat-against-wall mounting.

Write for Engineering Catalog DE.

Defrosting "Kit" includes Heat-Cel and Accessory Package containing all necessary controls*

* *Approved by Underwriters Laboratories*

Uniform Magnetic Efficiency
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DOLE REFRIGERATING COMPANY

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Super-Dry Refrigerants

By Name as well as Number"

. . . and you're sure of top performance—because Genetron refrigerants are *super-dry!*

Carried by leading wholesalers from coast-to-coast.

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Allied Chemical

GENERAL CHEMICAL DIVISION
ALLIED CHEMICAL & DYE CORPORATION
40 Rector Street, New York 6, N. Y.

In the Spotlight

REFRIGERATING EFFECT in a modern chemical plant is required in many places, and at temperatures ranging from above freezing to minus 300 F. A new type ammonia production process at Spencer Chemical Co., Vicksburg, Miss., utilizes NH_3 as a refrigerant at five points in the process of manufacturing NH_3 and NH_3 products from a combination of natural gas, air and water. Refrigerant-12 is used to condense the NH_3 in the refrigerating system. Air, water, nitrogen, oxygen and other gas mixtures are variously used in heat transfer applications which could also be described as refrigeration. The plant and process is described and illustrated in article starting on page 13.

AT A MEETING of the Executive Committee National Association of Ice Industries, Guy W. Jacobs announced his retirement as Executive Secretary after serving the Ice Industry in that capacity since 1951. To direct the work of the Association the Committee appointed Wm. T. Jobe Executive Vice-president and C. P. Austin, Secretary. For further details see page 16.

AN ICE SKATING rink, built over a swimming pool is now in operation on Chicago's Northwest side the other nine months of the year. Some interesting construction features were involved which are described in the article on page 17.

FOODS that had been irradiation sterilized and stored for up to three years by the American Can Company had important changes, according to a summary of the results. Various foods were tested and results shown, as detailed in article on page 20.

ROUTINE OVERHAUL and methods used for checking wear of moving parts in compressors, can often be improved upon. Through exchange of ideas and information, — the founding ideal of NAPRE, — engineers have devised many "kinks" which not only save a few manhours, but often results in a long range conservation of the Boss' capital investment. Minimizing wear without a doubt adds years of life to machinery and allows replacement funds to be applied elsewhere. In this month's installment of the "Prevention of Failures" series, the NAPRE Educational Committee presents a horizontal compressor cylinder aligning technique said to be accurate to within five ten-thousandths of an inch! See page 27.

WOULD YOU allow your engineer to use an additive in the ice-machine oil for your refrigerating system? A firm producing colloidal graphite indicated some time ago to one IR reader that his "experts" could see no adverse effect of adding such material to the lubricating oil! They could only visualize much longer compressor life through lessened wear. Practical and professional engineers leaped to answer this one, but Professor H. P. Hayes chose the reply by a lubrication technologist. Read the simple but emphatic facts to Question No. 1157 on page 35.

GREASE LUBRICATION for integral horsepower pumps is recommended by the Chief Engineer for a leading pump manufacturer. He emphasizes the trend by citing NEMA standards for motors. Read his arguments for grease over oil lubrication on centrifugal pumps, on page 24.

NEW CONCEPTS in frozen food cabinets came from a study conducted by The Pennsylvania State University College of Agriculture. In this test the standard condensing unit was replaced by one half its size. The test was entirely satisfactory and it was found that the cabinets, so refrigerated, provided relatively uniform stable low temperature at a reasonable cost. For additional details see article on page 38.

SPECIAL TRIBUTE to the National Frozen Food Distributors Association and the National Association of Frozen Food Packers was paid by the National Association of Refrigerated Warehouses at the annual Frozen Food Convention in Miami, Fla. See news note on page 48.

ALUMINUM clad storage doors have been installed in the Miami, Fla. warehouse of Food Fair Stores, Inc. representing the largest single installation of such doors in the country. Page 52.

COLD STORAGE greatly improves tolerance of dormant strawberry plants to pest-controlling heat treatment, according to the USDA. Nearly all plants stored at 32 F survived immersion in water at 127 F (for control of parasitic nematodes and cyclamen mite), as compared to 40 percent for non-stored plants.

Small Business Defined

FOR purposes of government procurement, the Small Business Administration has revised its definition of small business. Under new definition a small business concern is one that "(1) is not dominant in its field of operation and with its affiliates, employees fewer than 500 employees, or (2) is certified as a small business concern by SBA." Previously, all concerns with less than 500 employees were classified as small business even though such a firm might be dominant in its particular industry. SBA uses this definition as a guide in connection with the allocation of a "fair share" of government contracts to small business.—NARW Quick Sheet.

How to Cut Refrigeration Costs and Increase Capacity with Better Purging

If you don't have an Armstrong Purger, chances are your head pressure is 10 to 40 lbs. above theoretical—because all the non-condensables are not being removed from your system. Have you checked your pressure lately?

Remember, for every 4 lbs. excess head pressure, power costs go up 2% and capacity goes down 1%. You can quickly figure how much inefficient purging is costing you.

Your head pressure will *always* be within a couple of pounds of theoretical with an Armstrong Purger. It rids your system of air with almost no loss of refrigerant.

Here is what this means to you:

Lower Power Costs
"Power costs cut 20%"—Rubenstein & Son Produce, Inc., Dallas, Texas.

Increased Capacity
"Compressor capacity increased 10%"—Gulf Oil Corporation Wax Plant, Philadelphia, Pa.

Less Refrigerant Used
"$500 annual ammonia saving"—Howard Johnson Ice Cream Mfg. Plant, Baltimore, Md.

Less Cooling Water Needed
"Cooling water consumption cut in half"—Producers' Dairy Company, Brockton, Mass.

Time and Labor Saved
"Can take care of other duties while purging is going on"—engineer at Alta Vista Creamery, Forth Worth, Texas.

Safety and dependability are assured by the design of the Armstrong Purger. Its forged steel construction can withstand over 2000 lbs. hydraulic pressure. Working parts are stainless and heat-treated chrome steel.

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You can try an Armstrong Purger for 30 days and if you are not completely satisfied you can return it for a full refund.

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Purifying Gas at Minus 300 F!

Ultra-Low Temperature Used For Industrial Manufacturing of Ammonia Products

PRODUCTION of anhydrous ammonia at the Vicksburg Mississippi, Works of Spencer Chemical Company, was started in January, 1954. With a design capacity of approximately 200 tons per day, this was the first commercial plant to use partial oxidation of methane in making ammonia synthesis gas. Products in addition to ammonia include nitric acid, ammonium nitrate solution and a series of "Spensol" solutions for use as a nitrogen source in the fertilizer mixing industry.

Refrigeration plays an important role in the ammonia process at Vicksburg. In a tonnage oxygen plant which generates virtually pure oxygen and nitrogen for process use, temperatures as low as minus 300 F are reached. A "Freon" and liquid ammonia refrigeration system is used for chilling process streams in gas preparation and ammonia synthesis. A nitrogen wash system, in which hydrogen gas is purified by scrubbing with liquid nitrogen, is operated at approximately minus 300 F.

Aerial view of the Vicksburg, Miss. works of the Spencer Chemical Company. A 1600 ton NH_3—Refrigerant 12 cascade refrigerating plant is utilized for minus 300 F process operations.

Ammonia Process Description

The Vicksburg ammonia process is a highly integrated one. Plant layout is compact and a high degree of out-door construction has been employed. Extensive use is made of automatic controls. The *mind* of the process consists of a central control panel located inside the main compressor building, which is the *heart* of the ammonia plant. These features have aided in reducing the required operating force to about one-third the size of that necessary for earlier ammonia plants of similar capacity.

To simplify discussion of the ammonia process, it may be broken down into essentially three major steps: generation of pure nitrogen and oxygen; generation and purification of free hydrogen; and ammonia synthesis. (See upper right-hand segments of flow diagram, Fig. 1.)

Manuscript for this story was prepared at Industrial Refrigeration's request by W. A. Johnson, Works Manager, and Larry Lucchesi, Jr. Engineer, Vicksburg Works, Spencer Chemical Co. Photos and liaison were by Public Relations, Spencer Chemical Co., Kansas City, Mo.

Air Separation

Nitrogen (99.9 per cent pure) and oxygen (95 per cent pure) are generated by low-temperature rectification of liquid air. The air-separation plant (shown in Fig. 2) handles about 1,000 tons per day of atmospheric air, which must be carefully treated prior to liquefaction. Air from the atmosphere passes through two intake filters and is compressed centrifugally in two stages to 125 psig. Bath turbine-driven compressors and mounted on a single shaft.

Traces of dust and CO_2 are removed by scrubbing the air with a weak caustic solution, followed by a water wash. Air pressure is raised thereafter in two additional stages to 625 psig by a gas-engine driven, reciprocating mixed-gas compressor, which also handles nitrogen and methane. Water vapor is condensed and removed by an ammonia-cooled chiller followed by a separator. The air is dried in alumina dryers to a dew point of minus 80° F. Before entering the air plant.

Primary or high-pressure rectification of liquid air yields crude oxygen and nitrogen; final or low-pressure rectification gives the pure products. The nitrogen is used in washing hydrogen gas and in blending ammonia synthesis gas. The oxygen goes to the gas generators used in liberating free hydrogen from methane.

Gas Generation

The partial oxidation process departs from the conventional method of reacting steam with natural gas over a nickel catalyst to produce ammonia synthesis gas[1]. Here, at Vicksburg, natural gas is compressed to 400 psig, preheated, and reacted with pure oxygen under controlled conditions to produce a gas high in hydrogen and CO content. This gas is saturated with water vapor and reacted with steam for the shift conversion of CO to CO_2. The gas then consists of about 97 percent hydrogen and CO_2, with very small amounts of CO, methane, and inerts.

Carbon-dioxide is removed almost quantitatively (to less than 0.2 per cent) by two scrubbing operations. The first employs a solution of monoethanolamine, which is regenerated in a separate stripping column and circulated back through the scrubber (Pictured in Fig. 3). The second scrubbing operation uses a solution

[1]See "Refrigeration Used For Processing Ammonia", *Industrial Refrigeration*, Sept. 1954, Pages 16 & 17.

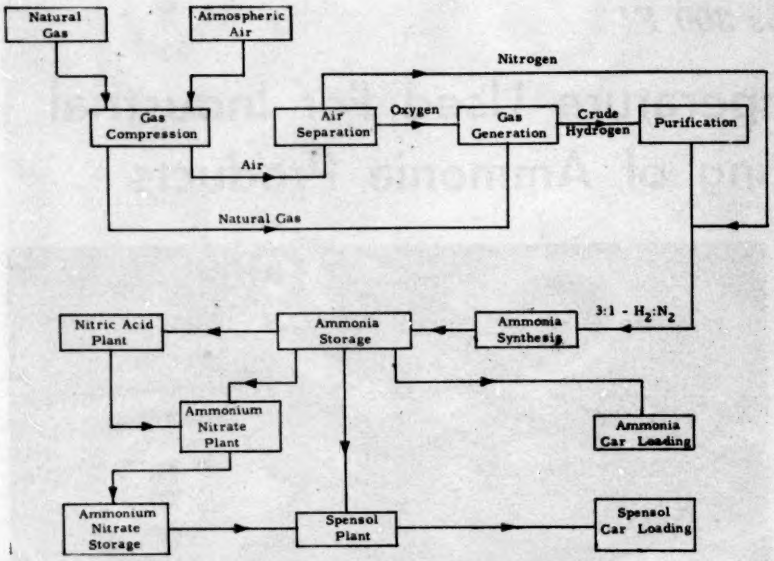


Fig. 1—Simplified Product Flow Diagram showing major steps in ammonia and other nitrogen solution manufacturing processes.

of caustic soda which is also recirculated continuously.

Final purification step consists of a low-temperature liquid nitrogen wash to remove the small amounts of remaining impurities. However, the gas emerging from previous scrubbing operations is saturated with water vapor. It is therefore passed through an ammonia-cooled chiller and a set of alumina dryers before entering the nitrogen wash system. This removes much of the water and lessens the possibility of freeze-ups at the reduced temperature of nitrogen wash. Gas from the wash tower contains 90 per cent hydrogen and 10 per cent nitrogen by volume. Additional nitrogen is added to bring the composition to the three-to-one ratio required for ammonia synthesis (see again, Fig. 1).

Synthesis

After purification and mixing of hydrogen and nitrogen, the final synthesis gas undergoes two stages of compression to approximately 3600 psig. At this point, special precautions are taken to avoid poisoning the ammonia converter catalyst, and to insure an ammonia product free from oil and water.

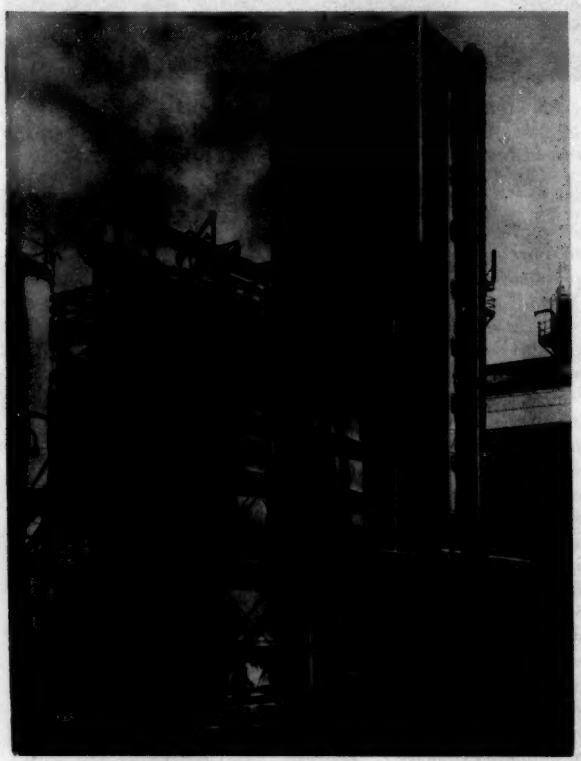


Fig. 2—Air Separation Plant—an important part of the partial oxidation process used commercially for the first time in ammonia synthesis at Spencer Chemical Co.'s new Vicksburg works. In the square apparatus, 25,000,000 cu. ft. of air per day, compressed to 600 psi and dried in alumina driers to a dew point of minus 80 F, is expanded which transforms it into liquid oxygen and gaseous nitrogen. Some idea of the efficiency of the process can be understood from the fact that nitrogen produced is 99.99 percent pure.

Fig. 3—Amine Reactivator—used in the purification process to remove carbon dioxide from the hydrogen taken from natural gas. CO_2 is exhausted from the taller of the two tall stacks. The shorter stack, with its ever-burning flare, disposes of "start-up gases".

process load. Each ammonia-cooled

Guy W. Jacobs Retires — Wm. T. Jobe

Ammonia synthesis is carried out in two identical units, the gas being recirculated continuously through the synthesis "loop." Circulation is accomplished by means of two novel German-made centrifugal booster compressors. After each pass over the ammonia converter catalyst, cycle gas is cooled in primary water coolers and ammonia-cooled liquefiers, where product ammonia is condensed and removed as a liquid. Fresh synthesis gas is then added to the unconverted cycle gas as it continues through the synthesis loop.

The product ammonia is let down to 300 psig in a flash tank, the flash gases re-condensed in an ammonia-cooled condenser, and the product passed through scale tanks to storage in one of four large Hortonspheres (visible in center of illustration, page 13).

Low-Temperature Processing

Economical operation of the liquid air plant calls for efficient recovery of the refrigeration in extremely low-temperature process streams. For example, streams of pure and impure nitrogen gas and pure oxygen liquid, leaving the low-pressure rectification column at about minus 300 F., are used to precool the inlet air to be liquefied.

Liquid Air Plant

Pre-cooling is done in a battery of "cold" exchangers arranged in parallel. Part of the inlet air passes through the full length of these exchangers, after which it crosses an expansion valve and is further cooled. Another portion of air is expanded to the same final conditions in passing through a turbo-expander. Here useful energy is converted in generating electricity for plantwide use.

Pure nitrogen gas from the air plant is compressed to 320 psig, and a portion is returned to the air plant to be re-liquefied. Entering the air plant at 90° F., it is progressively cooled and liquefied as it picks up refrigeration by exchange with cold streams. The liquid nitrogen returns from the air plant ready for use in the nitrogen wash tower.

Nitrogen Wash

The function of nitrogen wash is the removal of impurities from hydrogen gas. These impurities, mostly methane, argon, and CO, are actually removed by liquefaction. The liquid nitrogen is a scrubbing medium which supplies the refrigeration necessary for liquefaction. Thus, a portion of the nitrogen is vaporized into the hydrogen gas stream to replace the impurities.

The nitrogen wash scrubbing system pictured on the Cover and described in this article was designed by Foster-Wheeler Corp. for Spencer. The heat exchangers used in the system are the first of a new series by Trane Co. Conventional exchangers would have required a "cold box"—the cylindrical vessel—twice as large as pictured. Brazed aluminum surface with 1/8-inch serrated fins is used to sublime traces of CO_2 and water vapor in hydrogen stream. Two sets of exchangers are used so that one can be derimed while the other is in operation. High performance characteristics of the aluminum are said to permit maintenance of a 5 F temperature range.

Waste product from the bottom of the tower is sent through a bottoms evaporator in which the refrigeration is recovered by liquefying a stream of high-pressure nitrogen for additional feed to the wash tower. The overhead gas from the tower contains approximately 90 per cent hydrogen and 10 percent nitrogen by volume. Its refrigeration is recovered in a pair of "switch" exchangers which precool the incoming hydrogen gas.

Refrigeration System

Refrigeration requirements in the Vicksburg ammonia process itself call for a total system capacity of 1600 tons of refrigeration. For this purpose are provided two identical 800-ton compression units employing "Freon-12" as the refrigerant. The Refrigerant-12 is used to condense ammonia, and the liquid ammonia is circulated as a coolant for various process streams (see Fig. 4 for a simplified sketch).

Refrigerant-12 Cycle

Dichlorodifluoromethane (CCl_2F_2) was selected as refrigerant in keeping with the policy of outdoor construction. This high-molecular weight gas lends itself well to centrifugal compression. This type of compressor requires no housing and less maintenance than would a larger reciprocating compressor necessary to handle an equivalent amount of ammonia refrigerant.

Equipment in each Refrigerant-12 cycle includes a steam turbine-driven compressor, a water-cooled CCl_2F_2 condenser, a let-down flash tank, and a "Freon" evaporator which is actually the ammonia condenser. Flash gas is recycled to the compressor for interstage cooling. Compressor speed is regulated by the liquid ammonia temperature exit from the condenser.

Ammonia Cycle

Liquid ammonia is collected in a single receiver, from which it is pumped through the various chillers and condensers as demanded by the

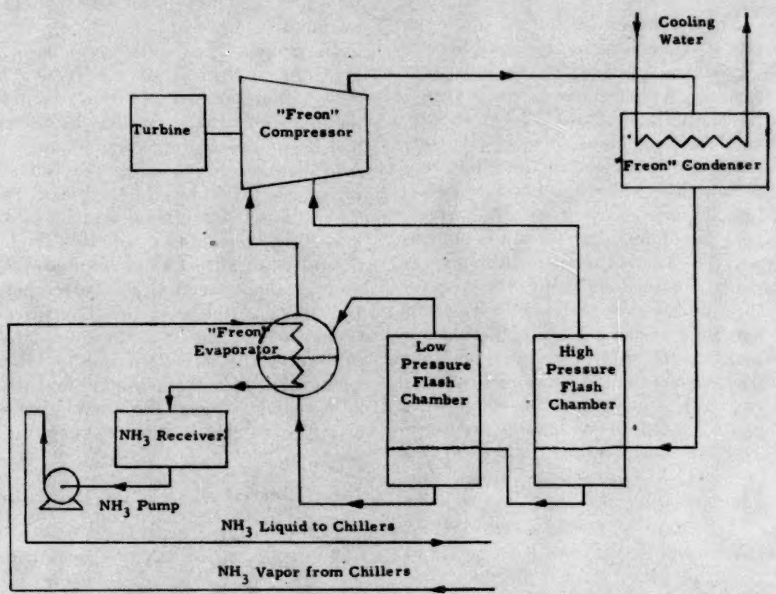


Fig. 4—Schematic of simple cascade type refrigerating system used by Spencer at Vicksburg. Refrigerant-12 is used to liquefy ammonia for two-level refrigerating effect at five specific points in the production processes.

process load. Each ammonia-cooled vessel is a shell-and-tube exchanger which holds a liquid level of boiling ammonia on the shell side. In boiling, the ammonia absorbs heat from the process stream in the tubes, and the ammonia vapor passes off overhead to return to the Freon evaporator for re-condensation. *A constant purge is held on the liquid ammonia receiver to prevent a build-up of inerts in the refrigeration system.*

Where Ammonia Refrigerant is Used

Ammonia refrigerant is used at the following places throughout the ammonia plant:

1. The air chiller is used to precool and remove vapor from air entering the air separation unit.

2. The synthesis-gas chiller precools and removes water vapor from the virtually-pure hydrogen gas going to nitrogen wash.

3. Two ammonia liquefiers in the synthesis units condense for removal the product ammonia formed in the synthesis loop.

4. The flash tank condenser reliquefies ammonia vapor that has flashed in the pressure let-down from the synthesis loop.

5. Two sphere condensers receive ammonia vapor drawn off the top of the storage spheres, condense it, and return it to the spheres as a liquid. This prevents excessive pressure build-up in the spheres.

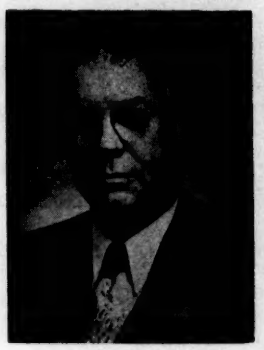
Two-Pressure NH_3 System

Since a large amount of water vapor is condensed in the air and synthesis gas chillers, it is important that the temperature in these vessels be maintained above 32° F. to prevent serious freeze-ups of the exchangers. However, in the other condensers listed above, a lower temperature is more efficient, as the primary goal is condensation of ammonia vapor. The correct temperatures are actually obtained by using a high-pressure and a low-pressure refrigerant ammonia system. A set of high pressure pumps delivers ammonia from the receiver to the air and synthesis gas chillers at 50 psig, where it boils at 35 F. Other condensers are serviced by low-pressure pumps at 10 psig which corresponds to an ammonia boiling point of minus 8 F.

A leakage of refrigerant ammonia into any of the process streams would result in little, if any, product contamination. This fact alone makes it more satisfactory to circulate ammonia rather than Refrigerant-12 throughout the system.

Guy W. Jacobs Retires – Wm. T. Jobe Elected Executive Vice-president – C. P. Austin Secretary National Ice Association

AT A meeting of the Executive Committee of The National Association of Ice Industries January 18, Guy W. Jacobs, who has served the Association for many years as Executive Secretary, having reached retirement age, applied for retirement as of April 1. Mrs. Georgia Cunningham, who has been with the Association as Office Secretary since



Guy W. Jacobs

the offices were moved to Washington, had recently accepted a position with another organization and submitted her resignation effective February 15. The Committee regretfully found it imperative to accept both resignations.

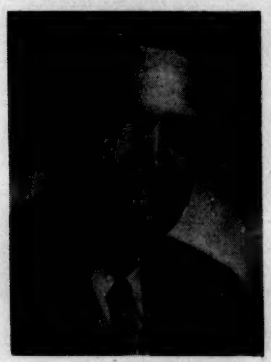
In making this announcement, E. L. Gunn, president of the National Association pointed out that during the past few years the Ice Industry has been undergoing many changes. And changes which affect the Industry must inevitably be reflected in the National Association and its program. In recognition of this fact, the Board of Directors of the Association at their meeting on November 15, 1956, authorized the Executive Committee to make a thorough appraisal of the situation and to take whatever steps they might find to be necessary to gear the Association's activities to the Industry's changing needs.

Jobe Elected

In the reorganization the Executive Committee turned to two seasoned staff members: Wm. T. Jobe and C. P. Austin, both of whom have had years of experience in association work, and are entirely familiar with the problems of the Ice Industry.

Mr. Jobe, who has served the Association competently for the past 15 years as its General Counsel, was elected Executive Vice-President. Mr. Austin, who for the past eleven years has ably directed the Association's research and marketing activities, was named Secretary.

In the announcement, the Officers and Directors of the Association recorded their great appreciation to Mr. Jacobs for his distinguished leadership of the Association for the past six years, and for his many contributions to its welfare and that of the Ice Industry through the years. He has served the Industry in numerous ways. He was one of the or-



Wm. T. Jobe

ganizers of the Ohio Association of Ice Industries in 1919, and president of that organization in 1922. In 1928 he was elected secretary of the Ohio Association, serving in that capacity until 1951. In the early 1930's he was the Regional Adviser for the Great Lakes Division of the NRA Ice Code Authority. He directed the Industry's two national advertising and public relations programs—NIA and NIPR. In 1942 he became a member of OPA where he organized the Ice Department, and then continued to serve that organization in a consultant capacity. He was elected President of NAII in 1938 and 1939, and, finally, he has served as Executive Secretary of the Association since 1951.

At this meeting the Executive Committee approved a new ice industry film. This film will be aimed at telling the story of the modern Ice Industry, suitable for use on television and for group showings.

into the rink itself. This eliminates

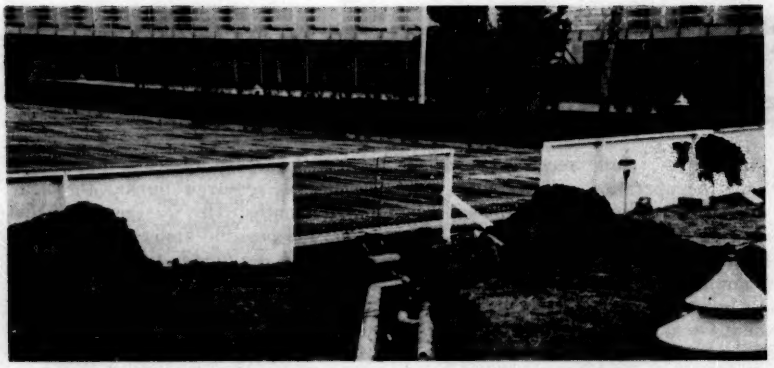
Skating Rink Built Over Swimming Pool Reports on Year's Operation

NEARLY a half century has passed since new ideas have been introduced in the construction of skating rinks. By that statement is meant any patentable ideas. From 1907 to almost 1956 there were hardly any patents applied for in connection with ice skating rink refrigerating systems, or improvements in previous systems that were patented. This information was given to INDUSTRIAL REFRIGERATION by John A. Heinzelmann, Jr., of John A. Heinzelman Jr. and Associates at Pastakee (McHenry) Ill. when the publication staff recently checked into the operation of a skating rink installed on Chicago's northwest side in November 1955.

It was in 1955, after having a swimming pool in operation for three months of the year, that President Oscar A. Brotman of the Tower Cabana, 3200 West Peterson Avenue, thought of a way to make use of the pool the other nine months of each year. He conferred with the Burge Ice Machine Co. of Chicago about the possibility of building an ice rink over the pool, supported in such a way that the foundation could be removed during the summer months. He was assured that this was possible and gave the green light for designing of a proper under-structure.

The Burge Company designed the construction of wood, to support the ice rink, the pool being covered with 1-inch tongue and groove lumber; this being covered with roofing paper to avoid leakage into the pool while ice is being prepared on top of it. The rink is 85 x 190 ft., using 1-inch plastic tubing on 4-inch cen-

Ice rinks can be placed over swimming pools for winter sports in a matter of days. Construction photographs shown above are evidence of this increasing application of refrigeration. At top left, a crew of four places the under-structure for the rink. Cabanas used as summer bathing facilities are pictured in the background. At lower left, a view of the tubing being placed for circulation of brine beneath the ice sheet. Rink side walls are in place and tubing is being placed under clips at specific centers. At lower right is the ice sheet ready for figure skating or hocky match. The owner reports erection of the rink in operation with as little as 12 man day's labor. Top right, is construction photo showing two twin cylinder VSA compressors, condenser, brine chiller and receiver being placed in position. The structure being erected above it is a light weight prefabricated steel housing.



Since the owner preferred that the refrigeration machinery room be located some 80 feet distant from the rink, supply and return headers for the brine freezing system were placed in the ground where the removal would not be required when the rink is dismantled again for the summer swimming trade. The manifold, distributing headers, plus shut-off valves are pictured in the center foreground.

ters and employing the Heinzelmann "Uni-Flo" patented brine circulating system. The rink is so designed that the headers can remain in the ground the year round, flower boxes being used to conceal their location. Plastic tubing is removed along with the decking and under-structure for the summer months.

Reported on in INDUSTRIAL REFRIGERATION in January 1956, this rink had been placed in operation in November 1955. Mr. Brotman says the operation of the rink has proven very successful. He has found the maintenance to be lower than anticipated and his operating expense meets the design estimates. It was learned that there are only 12 man-days labor involved when taking down or erecting the rink floor. Operating data indicates that the plant is operated with 5 F brine temperature. Average ambient temperatures for the nine-month season approach 45 F.

Reversing Refrigerant Flow

According to Heinzelmann these high ambient temperatures would ordinarily make it very difficult for a rink operator to maintain a good ice sheet, especially when the temperature approaches 70 F on some days and warm winds are experienced. However, the patented reversing principle applied to the brine system enables the rink operator to control his sheet more adequately.

No soft spots develop since the reversing of the brine takes the coldest brine to the warmest spot on the sheet. Dependent on fair weather conditions, the flow of brine is reversed three or four times a day. Under cold weather conditions the flow is reversed at least once a day which prevents the collection of sediment in the rink grids, a common occurrence in brine systems. The principle and reversing device are known as the Heinzelmann "Uni-Flo" system.

Design of the rink supports in itself was somewhat of an engineering task. The rink is supported from the pool surface and called for a special engineering consideration. Another important consideration is the dismantling for storage during the swimming season.

Reciprocating Refrigeration Plant

Refrigeration is by means of two Vilter 10½ x 10½ in. ammonia compressors, driven by two 100 hp Ideal electric motors, the plant having a total capacity of 150 tons at 20 lbs. suction pressure and 185 lb. discharge pressure. The brine is circulated by two 450 gpm direct- connected brine pumps, the entire plant being completely automatic with the use of Minneapolis-Honeywell thermostats which are actuated by temperatures of the brine returning to the compressor room.

The brine mixing and surge tank is about five feet high by three feet wide and six feet long, with 6-inch supply and return lines to the floor. The engine room is located in a Butler prefabricated building some 80 feet from the rink, and floor area of the building measures 20 x 40 feet and provides storage for the plastic tubing which makes up the floor grids.

In other installations, Heinzelmann pointed out that the "Uni-Flo" system has an even more unique feature in that the headers are frozen into the rink itself. This eliminates header trenches, insulation and involved support for the headers. There are no valves used in the "Uni-Flo" system. Purge lines and other piping accessories are also eliminated. Omission of such detail reduced the initial installation cost, and with the reversing principle accomplished by means of a patented device, operating and maintenance costs can be held very low. More effective heat transfer between the chiller and the ice sheet is effected by means of the reversing principle, according to data collected by Heinzelmann and associates.

Southwestern Engineers Conference Report

THE 31st Conference of Engineers was held by The Southwestern Ice Manufacturers' Association, Inc., October 24 and 25 in the Commodore Perry Hotel in Austin, Texas. Chairman of the Technical Committee, which sponsors the engineer's conference, was Obert K. Irvine, NAPRE member and past president of the Dallas chapter. Appearing on the program also were NAPRE members R. A. O'Neill, a national director and member of Texas Coastal Bend chapter; J. F. Moss, Dallas Chapter, and Dean W. R. Woolrich, College of Engineering, University of Texas.

A 14-page summary of the papers presented has been prepared by the Southwestern Ice Manufacturers' Association, Mercantile Bank Building at Dallas. General Preston A. Weatherred who is Counsel for the Association, recently circulated the bulletin to all owners, executives, managers and engineers of the Texas Ice Industry.

Thomasville Ice Celebrates

THE Thomasville Ice & Manufacturing Company, Thomasville, Ga., recently celebrated its 50th anniversary. J. W. Keyton, Sr., president, and Jim, Jr., secretary-treasurer, made full use of the occasion to tell their story and to remind the people of Thomasville of the Company's services.

The Thomasville Times Enterprise of January 10 carried a full-page advertisement complete with pictures of all company personnel. There was just enough copy in the ad to convey to the reader the type of services the personnel of the company makes available to him. In the same issue of the paper, a descriptive news story highlighted the history of the company, its contribution to the welfare of the community, and its personnel.

Irradiation-Sterilized Foods-Storage Tests

refrigeration facilities (3) decrease in money and manpower for main-

let's talk cents

When you buy a low temperature system and check the TOTAL costs of both the low and high side, you'll be pleased to find that

KRAMER (L) ***THERMOBANK***

COSTS NO MORE...

and you get so much more

ONLY*.. *THERMOBANK provides positive reevaporator with ample heat supply.

ONLY*.. *THERMOBANK completely protects the compressor — no liquid refrigerant to the compressor, no oil foaming, no motor overload.

ONLY*.. *THERMOBANK makes possible the use of the "Low Temperature" compressor without overloading during defrost, making possible serious reductions in first cost as well as significant operating economies.

WRITE FOR MANUAL TV-320

KRAMER TRENTON CO. • Trenton 5, N.J.

43 YEARS OF CONTINUOUS ACHIEVEMENT IN HEAT TRANSFER

Irradiation-Sterilized Foods-Storage Tests

DATA on irradiation-sterilized foods stored at 40, 70 and 98 F for periods up to three years were reported by G. B. Pratt and O. F. Ecklund of American Can Co., Barrington, Ill. This investigation is closely related to the TRRF-aided project at the University of Illinois, where the aim is to consider dosages and other variables that might be used with refrigeration to improve storage life. Here are some of the results reported by the American Can Company workers:

Ground Beef: Survived irradiation with an attractive color but with off-flavor and odor that was somewhat reduced by irradiation in the frozen state but not by pasteurication, sodium ascorbate, or frying. After nine months, the taste panel detected "liver" flavor and liquid formation which were less with pasteurization, thus suggesting enzyme action. Hard white particles also appeared.

Beef Tenderloin: Essentially the same as ground beef except that white particles did not appear in pasteurized beef.

Pork Luncheon Meat: In addition to off-flavor and odor, a pinkish liquid fat separated and a brown discoloration appeared on the loaf after a month at 98 F and two months at 70 F. The heated samples were less discolored.

Cured Ham. The ham had the least objectionable off-flavor which did not increase with storage, but color faded on extended storage.

Asparagus: Irradiation resulted in a loss of flavor and faint off-odor. Color declined within a month at 70 F. Blanching, use of vacuum, absence of brine, use of ascorbate all failed to change the effects of radiation.

Broccoli: Irradiation resulted in off-flavor, odor, and dark color. In spite of blanching to inactivate enzymes, storage resulted in gradual darkening to an unsightly brown within six months.

Brussels sprouts: Became brown within three months, with off-flavor and odor.

Cauliflower: Followed much the same pattern as broccoli and Brussells sprouts.

Peas: Slight off-flavor and odor but very good color after irradiation. Color had declined within three months.

Green Beans: The irradiated pack showed good color, better than canned beans, but not as attractive as frozen. The taste panel as a whole showed a preference for canned product over the irradiated.

Summary: In every food important changes in appearance or flavor developed with storage. Some, but not all, can be attributed to enzyme action — showing the chemical reactions other than enzymatic are causes of change, and that mild scalding cannot control them. Significant off-flavors developed in all the food tested.

TRRF Comments: It is highly valuable to obtain information on the behavior of irradiated foods during storage. These foods were sterilized and in some cases enzyme action had been reduced or eliminated by the use of a scald or blanching treatment — that is, mild heat. Apparently, other spoilage reactions, not fully understood, can take place — whose reaction rates can be reduced by refrigeration, of course. It is important that we learn more about these reactions.—TRRF Bulletin.

Radiation of Foods Military Aspect

FOOD irradiation from the point of view of the armed forces was discussed recently by Colonel Ryer III of the American Food & Container Institute in Chicago. This aspect is the most important of all and the author's discussion, presented last June at the meeting of the Institute of Food Technologists in St. Louis, places the whole subject in appropriate perspective.

He tells the story of military food supply in Korea from July, 1950 when hostilities began, until mid-January, 1951, when perishables reached our forces in adequate amounts to relieve the monotony of the B-ration diet. The problem of food supply was exceedingly difficult.

Going on to the present status of radiation research, he says: "There are presently in storage at 72 F at the QM Institute, a fairly impressive number of fruits, vegetables, meats and meat products that are quite acceptable as judged by results of taste-test panels." He lists a number that have been stored 31 weeks and others for shorter periods. All were irradiated at fairly low dosages.

Col. Ryer concludes that the degree to which radiation-processed foods will eventually be integrated into the food situation is problematic. However, he says, "promise exists in several very attractive military potentialities," as follows: (1) reduction in costs of food handling operations (2) decreased requirement for refrigeration facilities (3) decrease in money and manpower for maintenance, (4) reduction in food losses from insects, refrigeration breakdown, and troop refusal of monotonous canned items, (5) improved menu acceptability, (6) meal-type assemblies, and (7) increased use of fresh items because of extended shelf life.

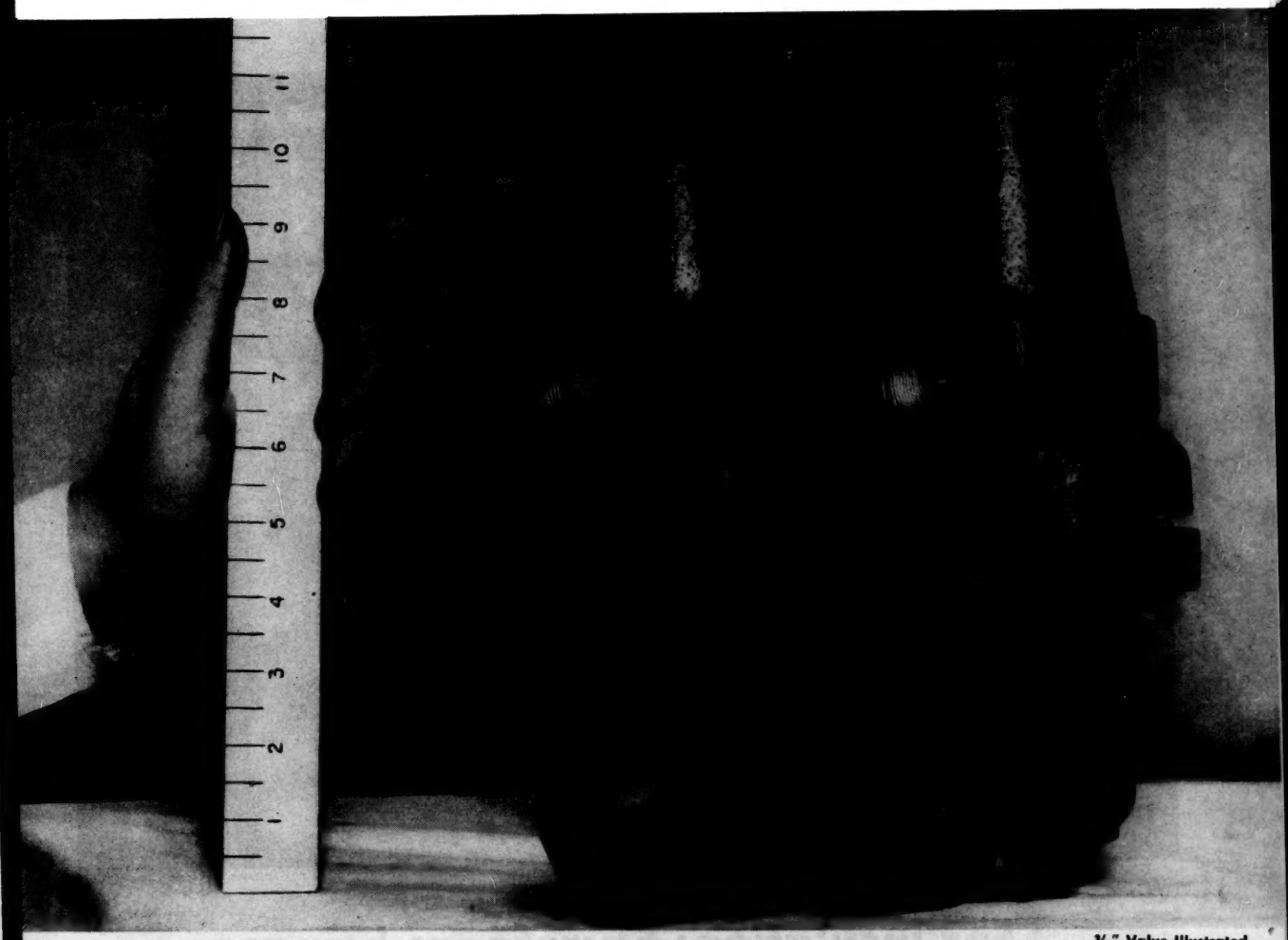
Col. Ryer also includes the fairly-well-known information on costs, off-flavors that commonly develop, and other difficulties involved in development of radiation facilities for foods. Military food continues to be a national problem; probably 6 to 8 million meals per day are consumed by our armed forces personnel. Research directed toward alleviation of the problem is appropriate. One must remember, however, that civilian food needs may differ basically from military requirements.

Radiated Foods Storage

A COMPARATIVELY new project on radiated food storage is getting under way at University of Illinois, under Dr. R. T. Milner. Two radiation sources, fuelorods and cobalt 60 are being used. Whole eviscerated chickens have been irradiated at two dosage levels and stored in polyethylene bags at four temperatures from 0 to 50 F. Several additives, such as antibiotics, will be investigated also. At present, storage data are not available, but complete reports will be issued as the work progresses.—TRRF Bulletin.

Prepared Frozen Food Processors Convention

A SLATE of officers for 1957 was elected at the meeting of the National Prepared Frozen Food Processors Association in Miami Beach, January 8. Joseph Settineri, president of Roman Products Corporation, Hackensack, N.J., will serve his second successive term as president. Also re-elected were Hy Epstein, president of Milady Food Products, Inc., Brooklyn, N.Y. as first vice-president, and Meyer Dubrow, president of National Frozen Meat Products, Inc., Philadelphia, Pa., as second vice-president. Elected as third and fourth vice-presidents respectively, were Warren Friedman, Mrs. Kornberg's Food Products, Inc., White Plains, New York, and Bruce Hartman of Holloway House, Inc., Chicago. Bernard Zipern of Red L. Foods Corporation, New York was elected treasurer. The meeting was highlighted by a supper club party Tuesday evening, January 8.



¾" Valve Illustrated

New, smaller YORK valves with 3 times capacity save you assembly labor, valuable headroom

A complete new line of York safety relief valves presents new ideas in valve design – a new principle of reaction for quicker opening and elimination of connecting nipples and flanges. As a result, these high-capacity valves are smaller than standard models, can be used to do the job formerly requiring a valve one or even two pipe sizes larger.

DESIGNED TO MEET ASME AND ASA B-9 standards York's new safety relief valves also have National Board Certification for capacity. They're available for use with ammonia, "Freon", "Genetron", and "Isotron" . . . either singly or in dual assemblies . . . with settings from 50 to 300 pounds.

NEW VALVES ARE SAFE, ACCURATE, and they relieve at set pressure. Superior design and use of special materials including stainless steel, cadmium plating, aluminum and modern synthetics for spring, valve button, and other moving parts prevents sticking from rust, corrosion and cold-welding. Thus they release virtually at pressure setting – well within pressure tolerances of code standards. In addition, the oval flange inlet permits bolting directly to the new smaller dual stop valve for added strength.

The full, new line of York valves is available right now from your York Wholesaler. Contact him or your nearest York Branch office (listed in the Yellow Pages of your telephone directory) today for Genuine York Accessories & Supplies.

York refrigeration air conditioning YORK B-W

the quality name in refrigeration

HEADQUARTERS
FOR MECHANICAL COOLING
SINCE 1885

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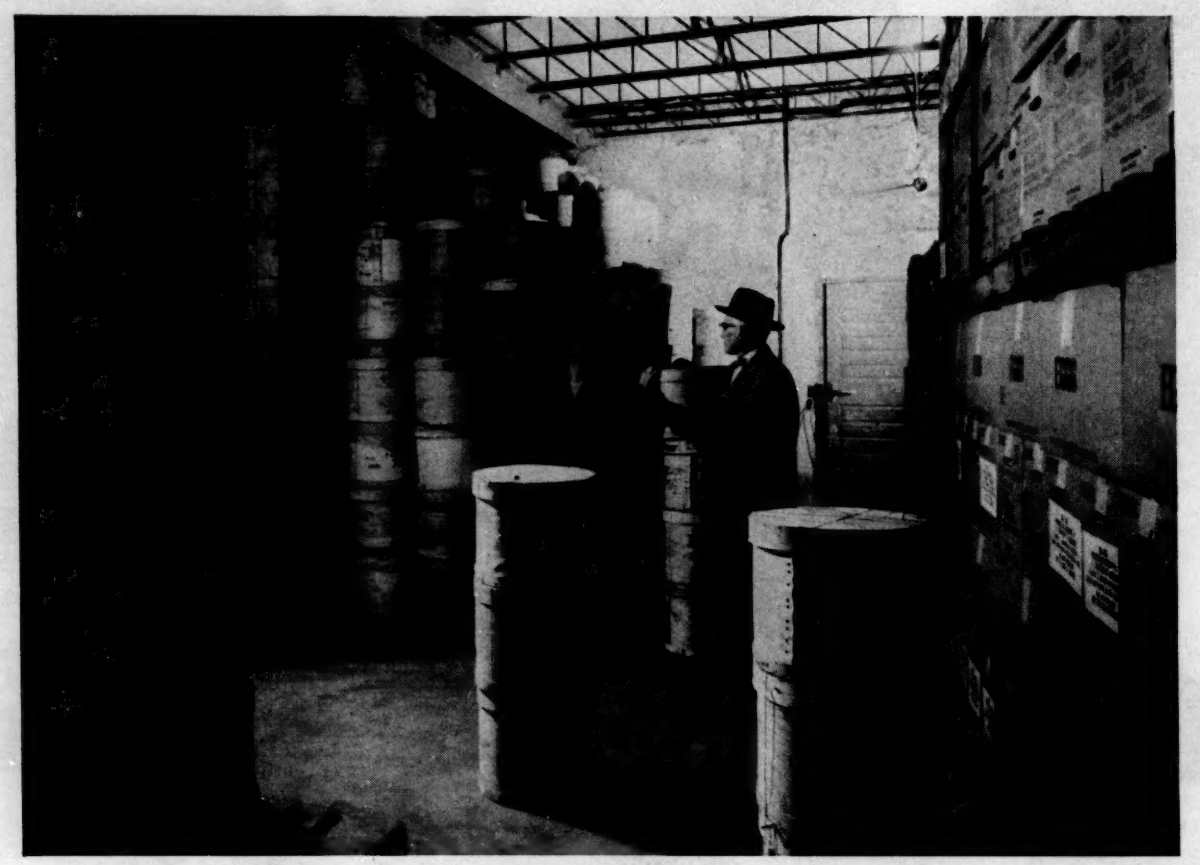
SUBSIDIARY OF BORG-WARNER CORPORATION



For insulation: Styrofoam brings best combination of properties

COMPARE STYROFOAM*	INSULATIONS			
	STYROFOAM	A	B	C
Low "K" factor	X		X	X
Superior Water Resistance	X	X		
High Compressive Strength	X	X		X
Light Weight	X		X	
Superior Resistance to rot and vermin	X	X		
Easy handling and fabrication	X			
Low-cost installation	X		X	
Lowest cost per year	X			

Permanent "K" factor average, 0.25. Avg. density, 1.8 lbs. per cu. ft. No odor. No food value. Pleasant to work with. Fabricates with common tools. Does not crumble or settle.

Cold storage plant's experience proves it!

Eleven years ago, Flint Cold Storage Co., a large Flint, Michigan, firm, used Styrofoam (a Dow plastic foam) to assure superior insulation in its original plant. Many additions have been made since then—including a very low temperature fruit freezing plant. And Styrofoam has been used in every case (see photo) for both equipment and building insulation.

Flint's Russell Soule writes, "We are heartily endorsing it to everyone for its low cost, high insulation efficiency, as well as its ease of installation." For complete information write THE DOW CHEMICAL COMPANY, Midland, Michigan—Plastics Sales Department PL1700C.

*Styrofoam is a registered trademark of The Dow Chemical Company

YOU CAN DEFEND ON DOW

WHICH STYROFOAM DISTRIBUTOR IS NEAREST YOU?

CALIFORNIA

Colma: Western Foam Products, Inc.
Los Angeles 13: Pacific Foam Products Co.

FLORIDA

Tampa: The Soule Co.

GEORGIA

Atlanta 8: Badham Sales Co.

ILLINOIS

Chicago 11: The Putnam Organization, Inc.

KANSAS

Kansas City: Styro Products, Inc.

MASSACHUSETTS

Ipswich: Atlantic Foam Products Co.

MICHIGAN

Detroit: Par-Foam, Inc.
Midland: Floral Foam Products

MINNESOTA

Minneapolis 8: Edward Sales Corp.

MONTANA

Billings: Madden Construction Supply Co.

NEW YORK

Rochester 20: William Summerhays Sons Corp.
Long Island City 1: Styro Sales Co., Inc.

OHIO

Cincinnati: The Seward Sales Corp.
Cleveland 13: Structural Foams, Inc.

PENNSYLVANIA

Plymouth Meeting: G & W H Corson, Inc.

TEXAS

Houston: The Emerson Co.

UTAH

Salt Lake City 10: Utah Lumber Co.

WASHINGTON

Seattle 9: Wiley-Bayley, Inc.

WISCONSIN

Milwaukee: S & S Sales Corp.

CANADA

Kitchener, Ontario: Durofoam Insulation, Ltd.
Edmonton, Alberta: Northern Asbestos & Bldg. Supply Co., Ltd.
Vancouver, B. C.: Wiley-Bayley Co., Ltd.

THE DOW CHEMICAL COMPANY
Midland, Michigan

Space Heating a Topic at Power Conference

HEATING the homes of tomorrow with electricity will be among major topics to be discussed at the 19th annual American Power Conference to be held at the Hotel Sherman in Chicago, March 27-29.

The conference, sponsored by Illinois Institute of Technology in cooperation with 14 universities and nine technical societies, is expected to be attended by more than 3,000 business and industry executives, scientists, engineers, educators, and government officials, according to conference director R. A. Budenholzer, Illinois Tech professor of mechanical engineering.

Place of the Heat Pump

Heading the trio of speakers dealing with space heating on March 27 will be R. C. Jordan, chairman of the mechanical engineering department, University of Minnesota, whose subject will be "The Place of the Heat Pump and Solar Energy in Space Conditioning."

He will be followed by W. R. New, supervisor, special studies section of the division of power utilization, Tennessee Valley Authority, speaking on "Electric Heating in the Tennessee Valley—A Pattern for the Future," and Sidney Miner, industrial sales manager, central district, York Corp., on "Air Conditioning with the Compound Heat Pump."

Other Subjects Scheduled

Other subjects scheduled for the technical sessions on each of the three days are:

March 27—Central station steam generators, water technology, and extra high voltage systems, the latter including talks by leaders in the development of high voltage transmission systems in France, England, and Sweden as well as the United States. An evening forum on trends in employment conditions for engineers, sponsored by the Engineers Joint Council, will conclude the first day's activities.

March 28—Steam turbines, hydroelectric power development, electronic applications, electrical distribution, central stations, electric systems, and three sessions on water technology.

March 29—Gas turbines, research in the electric power industry, condenser and feedwater circuits, two electrical industrial sessions, digital computers for mechanical problems, nuclear energy, industrial power plants, and computers and network analyzers.

Breweries Merge

THREE well known breweries in three different geographical areas of the United States recently merged into a single corporation. The three firms are International Breweries Inc., of Detroit Mich., Krantz Brewing Co. of Findlay, Ohio and the Southern Brewing Company of Tampa, Fla. This merger brings the total number of breweries involved to four, International having previously acquired the Iroquois plant at Buffalo, N.Y. in 1955.

According to an announcement by Bruce Berckmans, president of International Breweries Inc., each brewery will continue to produce the brand or name beer for which it is primarily known. There will be no change in beers, label, personnel, distribution or management policy. Berckmans indicated that the merger will add strength and security, and promote continued growth and expansion, better equipping the four breweries to meet the impact of current competitive trends. Upon completion of the merger, the combined production of the breweries involved will be in excess of 1½ million barrels annually.

According to reports, acquisition of the additional breweries by International was accomplished through funds raised on the sale of International's Frankenmuth, Michigan, plant to Carlings of Cleveland. It is understood that International's new financial structure will consist of 560,000 shares of common stock, with a long-term debt of $2,000,000 carrying a maximum interest rate of 4½ percent. Stockholder's equity will exceed $10.25 per share, compared with the current $8.52.

Apprenticeship Conference

MAINE will be host this year to the Eastern Seaboard Apprenticeship Conference to be held at The Marshall House, York Harbor, Maine, on June 5, 6 and 7, 1957. Among the Thursday, June 6, morning sessions, will be one devoted to the pipe trades. Refrigeration contractors and service organizations will probably be interested in this sectional meeting planned and operated by the National Master Plumbers Association and the Plumbers Union. None of the sessions in the three-day conference carry any conference for an apprenticeship training among the operating personnel of major refrigeration installations. Chairman of the Maine State Apprenticeship Council is Cyril M. Joly.

Why Grease . . .
For Centrifugal Pump Bearing Lubrication

PHILLIP J. OLMSTEAD
Chief Engineer, Goulds Pumps, Inc.

ADMITTEDLY, oil or oil mist lubrication is a better lubricant from the standpoint of lubrication only. However the trend to grease lubrication of ball bearings by machinery manufacturers becomes more and more pronounced. Electric motors, for example, show this trend. Grease is the standard lubricant for integral horsepower motors within the NEMA series of all manufacturers.

Contamination and maintenance of proper oil level reduces the usefulness of oil as a lubricant. Contamination of oil by moisture, fumes, dirt or dust, even in minute quantities, can reduce bearing life rapidly. Oil lubricated equipment placed out of doors with no protection from the elements is particularly susceptible to contamination. Centrifugal pumps, because they are handling liquids adjacent to the bearings and in locations that are often constantly damp and humid, are an example of mechanical equipment that requires many precautions to prevent contamination of the oil.

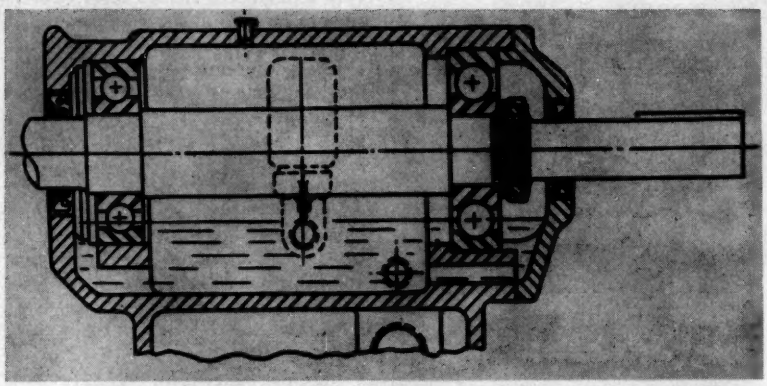


Fig. 1—Detail of constant oil lubricated bearings. Note different size bearings. Constant oil-level device must be dead level—lengthwise and crosswise—for best possible lubrication under such circumstances.

Proper Oil Levels Difficult To Maintain

Maintenance of proper oil level is difficult. The static level of oil, in relation to a ball bearing for flood lubrication, is recommended to cover between one third and one half of the lowermost ball. In equipment where more than one ball bearing is lubricated from the same oil reservoir, and usually the bearings within such a housing are not the same size, it is difficult to establish and maintain an oil level that is not too low for the smaller bearings and too high for the larger bearings.

The result of too low or insufficient lubrication is obvious. Too high an oil level causes excessive heat.

With constant level devices a desired level of oil can be maintained, providing the machine is dead level, both lengthwise and crosswise (see Fig. 1). Variations from dead level upset the established oil level. When out of level lengthwise, the further spaced the bearings, the more the actual oil level departs from the established desired level. On portable units, the problem of maintaining levels is magnified greatly.

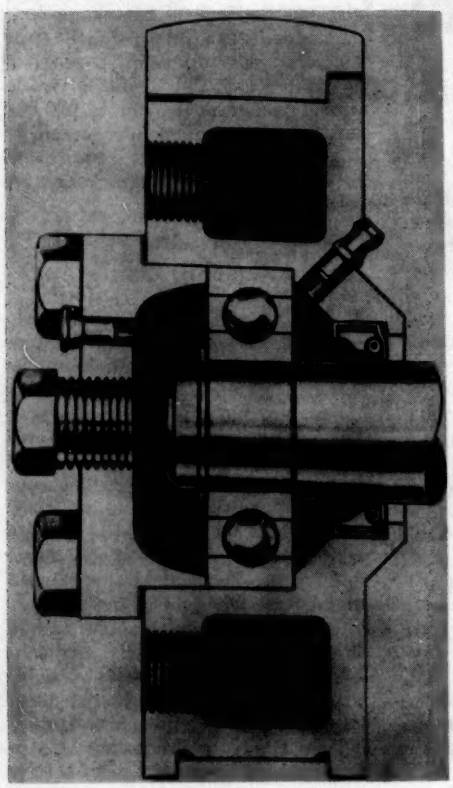


Fig. 2—Construction of liquid cooled bearing housing on a Gould 3405 centrifugal double suction pump. Vent housing prevents over-greasing.

Grease Advantages

Grease lubrication eliminates almost completely the problems encountered in oil lubrication. A barrier of grease ahead of the bearing prevents to a great degree the entrance of moisture, fumes, dirt or dust to the bearing itself. (This cannot be said to the same degree of the so-called "pre-lubs" or "sealed-for-life" ball bearings.)

Grease in a bearing cavity is static in comparison to oil. It is not churned through the bearing as is oil so that contaminants are not passed through the bearing to cause wearing and pitting.

Grease presents no problem of lubricant level. In fact, equipment normally designed for horizontal operation using grease, can in many cases be operated vertically with no changes required in the lubrication system[1].

Over-Greasing Fault Costs Industry Heavily

However, industry has applied the axiom of "too much is better than

[1]Ed. Note: It is suggested that the pump manufacturer be consulted, as placement of a horizontal machine in a vertical position in other cases may bring on serious thrust problems.

too little" in grease lubricating ball bearings and has lost millions of dollars per year in production and maintenance through over-greasing or over-lubricating. Grease inserted in a bearing cavity under pressure, with no relief to prevent too much lubricant, causes excessive heat. Under this heat the grease breaks down and carburizes and its lubricating properties are lost.

Over-Greasing Hazards

In recent years, three factors have worked to reduce the over-greasing hazard. First, machinery builders have incorporated reliefs in the design of their machines to permit only a predetermined amount of grease to be retained in the bearing cavity (see Fig. 2).

Second, the technology of grease has improved immensely. The sodium, and more recently the lithium base greases, have greatly improved the quality of lubricants. These new greases stand higher temperatures and do not turn acid or rancid with the resulting pitting of the bearing to cause failure.

Third, education and lubrication programs instituted in industry by technical groups and lubrication engineers have provided a realistic approach to the problem of over-lubrication using grease. No longer do lubricating crews grease bearings every day and in some industries working 24 hours a day, grease bearings three times during that time.

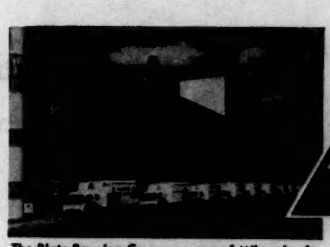
Lubrication and Maintenance Suggestions

Centrifugal pumps ordinarily require additional grease only after 2,000 hours of operation. On continuous service, this is approximately every three months. For preventive maintenance reasons, annual overhaul and inspection of pumps is recommended. At this time, the bearings and housings should be completely cleaned of used grease and replenished with new lubricant.

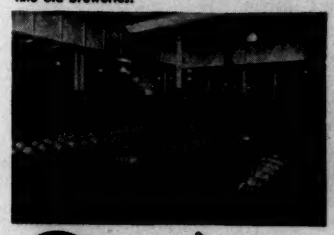
For centrifugal pumps up to speeds of 3600 RPM, grease possesses all the necessary lubricating qualities. With intelligent use, grease is a good universal lubricant for pumps.

New Alaska Cold Storage

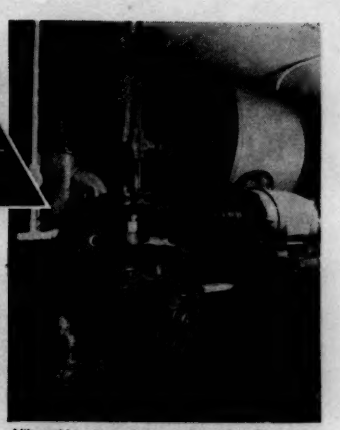
PLANS to construct a cold storage plant in Kodiak, Alaska are being considered by Wallace George, president of the Juneau Cold Storage Corp. George visited Kodiak last month to confer with City Council officials and Kodiak stockholders on the new venture.



The Blatz Brewing Company, one of Milwaukee's fine old breweries.



The Vilter Blast Coil and its components are located directly above the racking room. Air is distributed by Vilter duct work.



Vilter thirty-ton evaporator showing Blast-type Coil and part of fan assembly. Photo taken with enclosure removed.

Q- Why is Vilter equipment preferred in breweries?

costs less to own*

Careful design of all Vilter equipment and the exact engineering of refrigeration system requirements has earned for Vilter a recognized place in the brewery industry.

A typical problem solution: The Blatz Brewing Company, an old time Vilter customer, recently decided to renovate its spacious racking room. To provide the necessary refrigeration effect, it was decided to install a Vilter blast type coil in space available directly over the racking room. The thirty-ton evaporator consists of 10,500 sq. ft. of Vilter flooded square-fin surface, and thus assures the required heat removal.

The triplex fan delivers approximately 22,000 cfm, and this air is distributed by means of a Vilter Continuous Slot-type aluminum duct work. This particular type duct with the slot placed along the bottom eliminates any possibility of dust or foreign material accumulating . . . helping to maintain high efficiency.

The entire Vilter installation does not take away any valuable floor space from the racking room, and will enable future expansion without relocation of refrigeration equipment.

Consult with Vilter engineers for a solution to your brewery refrigeration problems.

Visit us at booth No. 217 at the Brewing Industries Exposition in Chicago.

* Savings in low first cost are not the complete answer when considering the installation of refrigeration equipment. But savings in terms of years of extra service, reliable performance and minimum maintenance—that's where Vilter excels in low-cost ownership.

Vilter QUALITY CRAFTSMANSHIP that lasts... ENGINEERING DESIGN that guarantees performance

REFRIGERATION and AIR CONDITIONING

THE VILTER MANUFACTURING COMPANY, Milwaukee 7, Wisconsin

Air Units • Ammonia & Freon Compressors • Booster Compressors • Bandolet Coolers • Water & Brine Coolers • Blast Freezers • Evaporative & Shell & Tube Condensers • Pipe Coils • Valves & Fittings • Pakice & Polarflake Ice Machines

Practical Refrigerating Engineer

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Operating engineers of all refrigerating plants are invited to affiliate with the National Association of Practical Refrigerating Engineers, Inc., an educational association, "not-for-profit".

From the President's Desk

Current Maintenance Series Commended

COMMENTS of highly complimentary nature have been received on the NAPRE 1957 series dealing with the "Prevention of Refrigerating Plant Failures". Both operating management and manufacturers have responded with praise.

Alerts Operating Management

From the Supervisor of Refrigeration for a multi-property retail food organization came this comment on the preventive maintenance paper "One Part Which Management Can Play In the Prevention of Refrigerating Plant Failures", January 1957, INDUSTRIAL REFRIGERATION, page 31:

"This article clearly points out the lethal potentialities of refrigeration plants and makes one wonder whether we of management are taking enough precaution to avert such accidents before they actually occur. Would you be good enough to advise as to your Association's planned educational program, literature, etc., available to industry to pass on to operating engineers and maintenance people."

Manufacturers Interested

The president of a nationally known compressor manufacturing company summoned NAPRE's representative to his office to express appreciation for this very same article. With NAPRE's permission, he intends to reprint the discussion and circulate it to management employing his equipment.

The headquarters office of NAPRE has received other compliments on this and past articles in this series, all of which are testimony to the ability of the Educational Committee, its writers, and contributors. As national president it's a pleasure to use these "official" columns to commend this work and encourage more of it.

Pushes Industry Relations

Such correspondence as evidenced above, shows definitely that management is interested in the NAPRE program. Manufacturers also. Both will help NAPRE — and are doing so at the national level. They will do more if NAPRE Chapters have a place for them to help on the local scene. National Industry Relations Chairman Larry Benedict contends that the Chapters can do the best work for NAPRE in this field of activity. He recommends that each chartered group:

Form a publicity and public relations committee, assigning them an industry relations project as their first work;

Operate with a more active plant safety committee, expanding the present series of safety meetings;

Support local apprenticeship programs, encouraging more young men to enter the refrigerating industry at our level; and

Cooperate in the National Industrial Membership drive from April 1 to October 1, obtaining not only Contributing members who will support local activities, but promoting Sustaining and Sponsoring members at national and regional levels as well.

Newest Industrial Members

A number of manufacturers and contractors have not waited for the Industrial Membership drive to get underway. Chicago Chapter has enrolled the J. E. Watkins Co., of Maywood, Ill. The Reilly-Benton Co. of New Orleans, was signed up by Louisiana Chapter No. 2. Early in February your national president welcomed the newest sustaining member to the Industrial class, The Vilter Manufacturing Co., Milwaukee, Wisc. These participants in our educational objectives will be honored at the annual Breakfast Session, an integral part of our National Convention, on Wednesday, November 20, 1957. Hotel Del Prado, Chicago.

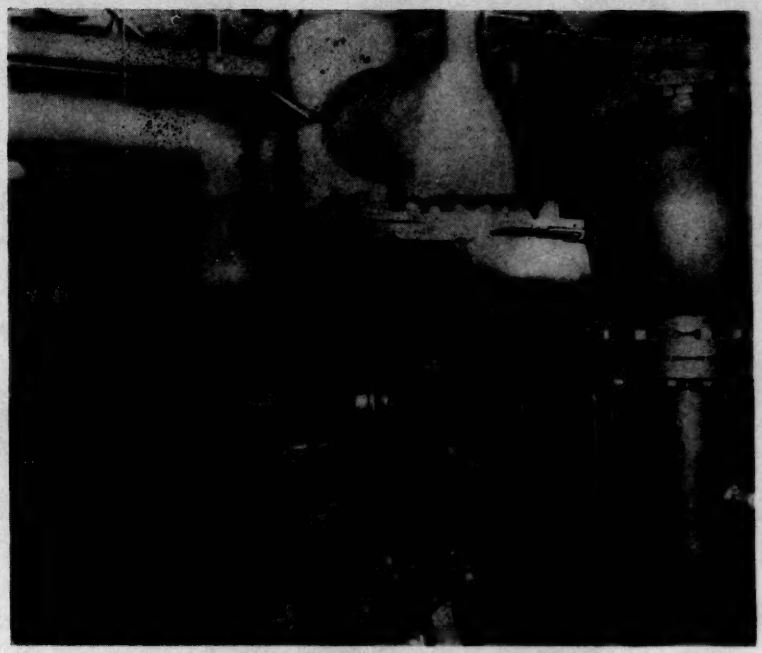
Notes Improved Reports

Chicago Chapter's scribe took his cue from the standard Chapter Report Form under "Educational Program", and asked the speaker to help in the preparation of his report for January. When pinned down by the committee as to his success story on the improved quality of the report, O'Reilly (Chicago's scribe) stated that "the speaker cooperated 100 percent".

Cooperation was in the form of reproduceable photos, a copy of the talk and the manufacturer's literature. With written suggestions from the speaker, a report was put together which the committee feels is deserving of top mention for the month. See "Refrigerant and Water Valves in Industrial Refrigeration," in this issue.

Bert C McKenna

In the Prevention of – Refrigeration Machinery Failures



Head end of a 250-ton horizontal duplex two-stage compressor. Low pressure cylinder in the foreground has a 30-in bore; the high pressure, 15-in. mis-alignment of these cylinders could be costly.

Horizontal Compressor Alignment Is Important

The Educational Committee
NAPRE

HORIZONTAL double acting refrigeration compressors like the smaller more compact high-speed machines, require a certain amount of inspection and overhaul annually. Being of more rugged construction, wear of moving parts may not be as rapid, but failure to inspect for abnormal wear can certainly result in more expensive major repairs by the next overhaul period.

The plant engineer responsible for this type of machine will always make it a point to check the alignment of the cylinder bore with that of the crosshead travel. Conventional methods of checking alignment will not do in the case of one engineer. In addition to presenting the annual inspection and overhaul routine used by this chief, it is the intention of this paper to present the unique and most accurate method employed at this plant for center-aligning equipment such as shown above, and in Fig. 1.

Plant Machinery Described

Two Worthington Corporation electric driven horizontal duplex ammonia compressors are employed in the Dearborn St. plant of Central Cold Storage Company, Chicago. These compressors are double acting and arranged for two stages of compression in each unit. The aggregate standard tons of refrigeration is 500. Each unit is equipped with a liquid intercooler between stages.

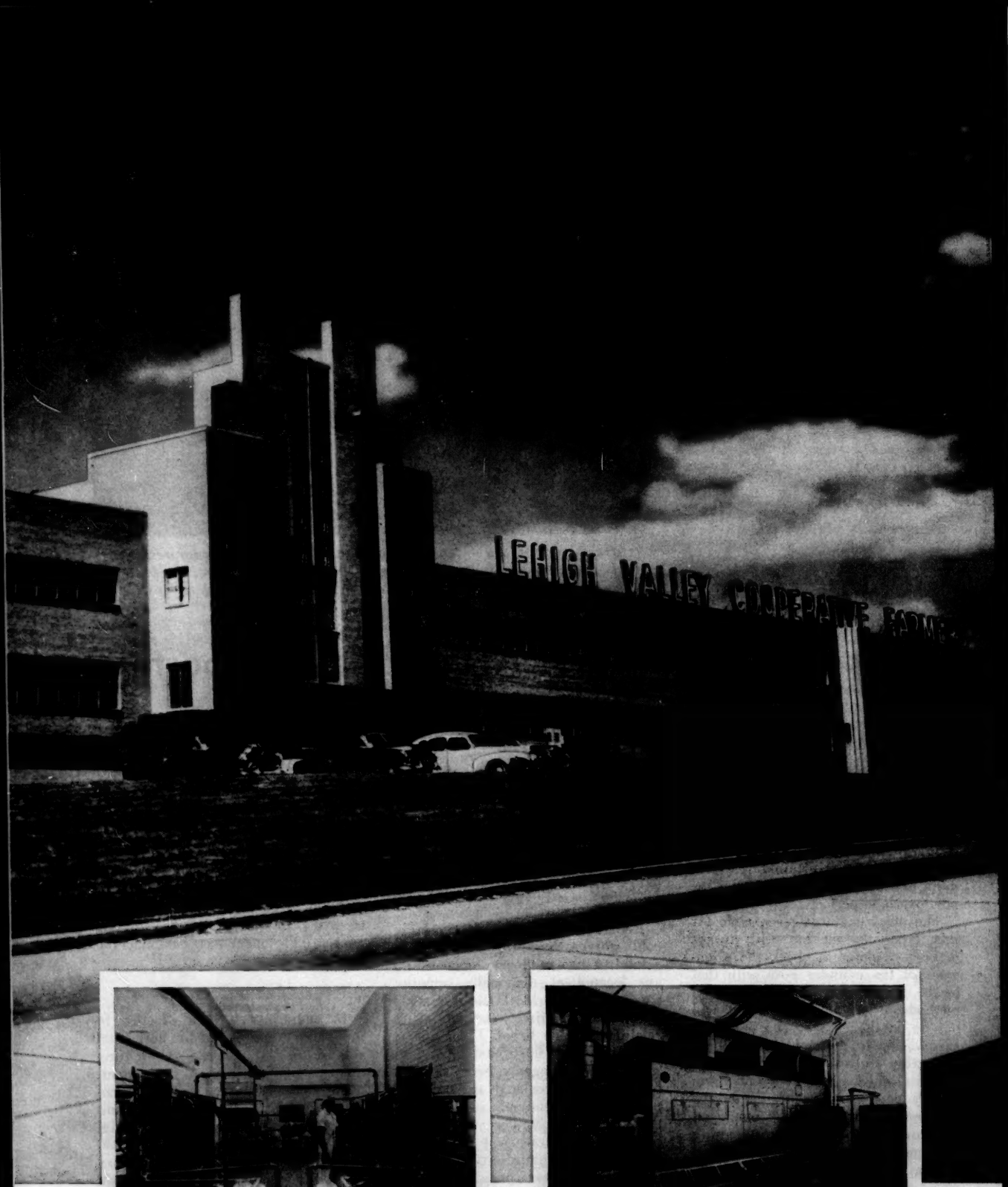
Actually, the plant serves two large cold storage buildings which have a total of five million cubic feet and are located at diagonally opposite corners of a city block. Refrigerating effect is by indirect method, using calcium chloride brine. The brine is cooled in four horizontal shell and tube heat exchanger vessels, with the brine being circulated through the tubes and the ammonia contained in the shell. Two chillers operate on each house, operating in pairs. The Dearborn St. pumps circulate 1450 gpm, while other pumps circulate 1250 gpm through the Clark St. house.

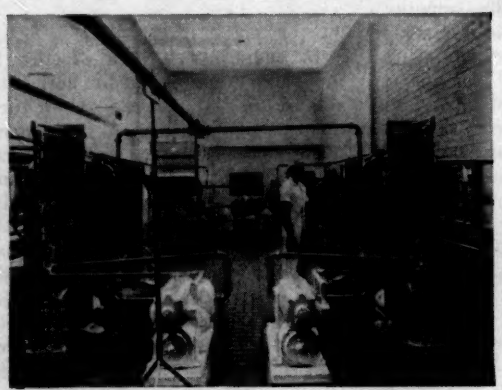
Operating Practices

Control of the ammonia is accomplished through liquid solenoid valves controlled by liquid level floats. Condensing is by means of three vertical shell and tube condensers manufactured by Vilter. Chicago River water is used as a condensing media, the condenser pump delivering 1800 gpm. With ideal condensing water temperatures available year-round, the plant has produced refrigerating effect when required, far in excess of machine design. Through check of brine circulation and temperature of brine to and from the storage, nearly 325 tons effect per machine has been noted.

Alternate Compressors

In operating, it is a practice in this plant to use one of the horizontal compressors at a time, alternating them each three months. In summer, maximum discharge pressures encountered are 155 psig; winter minimum condensing pressure is 60 psig. At peak hours from 4:30 to 7:30 pm., October 15, through February 14, all large motors in this plant, such as the 600-hp Electric Machinery Co. synchronous engines which drive these compressors, are secured to avoid penalty demand charges. During this period the "flywheel effect" of the brine provides all the necessary refrigeration.





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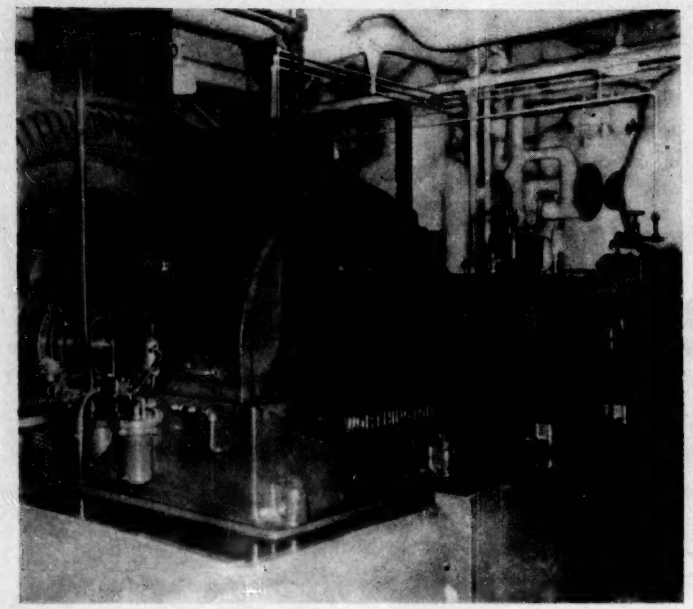

Fig. 1—Another view of the machine shown on the title page, this from the crank-end of the high pressure side. Note at left the Nugent oil filter and piping for bearing lubrication system. Packing and cylinder needs are supplied from the Manzell lubricator atop the crosshead portion of the frame.

Annual Overhaul Routine

Inspection and overhaul performed annually on these horizontal compressors normally consists of:

1. Checking rod travel with a dial indicator to determine the parallel travel of the piston and rod; i.e. alignment.

(Pressure is relieved from the packing, allowing it to float during this inspection, which prevents distortion possibilities during the readings.)

2. Dismantle suction strainer and compressors valves for cleaning.

3. Check valves for broken ribbon strips (feathers) and for wire drawing.

4. Take lead wire clearances on head and frame ends of piston.

5. Check for cylinder wear by micrometer gauge readings of cylinders.

6. Remove rings from piston. Check ring wear by micrometer gauge readings of gap with ring inserted in cylinder. Check ring grooves for wear and ring clearance (spacing).

7. Remove bearing caps. Take leads of all bearings.

8. Log all readings and check with previous year's log for wear.

9. Check pins, rod, cylinders for signs of unusual stress, cracks or other evidence of fatigue.

10. Clean the oil filters and the force feed lubrication system, and change oil. (Filters are actually cleaned quarterly, but oil changed only once yearly).

11. Clean and check operation of the Manzel cylinder and packing gland indicator.

Lubrication Sidelights

Machines in this plant are additionally equipped with Nugent oil filters. Inspection of the quarterly samples in plant office shows the lubricating oil to be clear and clean. It is changed only once a year, and then only because of the possibility of contamination from the ice machine oil used for rod lubrication. According to the Chief, they have experienced no bearing troubles, wear is negligible, and a 75-cent investment obtains a new filter at annual overhaul time.

Dial Indicator Test Shows Misalignment

First step in the annual inspection as outlined above was to take a dial indicator reading on rod travel. Test showed a high pressure cylinder was down 0.010-in. at the head end. Therefore, the machine was scheduled for realignment. As is customary in this plant[1], management was notified that the machine would have to be taken out of service for realignment. After checking with warehousing and purchasing departments as appropriate, a date was set up for the work.

Shutdown Steps

Procedure followed in this plant for shutting down entirely would normally follow these steps:

1. Secure the ammonia valves to the brine coolers. This is accomplished electrically by disconnecting power to the solenoids. Then the solenoid stop valves are closed.

(This procedure permits pump down of the brine coolers and the balance of the ammonia system, using the inter-cooler for de-superheating. This could not be accomplished if the king valve at the receiver is secured first).

2. Pump evaporators (brine coolers) down sufficiently to prevent excess priming when system is restarted.

(Although the system has adequate suction trap protection, this practice is considered safest. It has been found that ten minute pump-down is more than adequate).

However, since only one unit is to be taken out of service, the plant shut-down procedure is modified at this point as follows:

3. Secure the main suction valve at the first stage (booster) of the compressor.

4. Continue pump-down until pressure on intermediate inter-cooler is negative.

5. Secure the motor. Stopping the motor is by means of a push-button station control. Main disconnect switch to the compressor motor is pulled out, locked and tagged out also, as a precaution against any accidental starting.

6. Secure suction and discharge valves on the second (hp) stage of the unit.

(Normal peak period shut-down would not require securing suction valve on the high pressure side of the machine, a practice actually followed in this plant. However, since this is to be an overhaul or a shut-down of longer duration, inlet and outlet valves are actually secured.)

7. Secure the discharge valve from the first stage cylinder.

8. Shut off jacket water.

9. Pump down both cylinders with a pump-out machine (a 4½ x 4½ Vilter, VSA twin-cylinder unit is used for this purpose).

10. Open atmospheric valves on both cylinders. When cylinders are vented, compressor is ready for dismantling.

[1]See "Engine Room Practices & Procedures in the Prevention of Refrigerating Plant Failures; Bert C. McKenna, C.E., Central Cold Storage Co., Chicago; Page 29, *Industrial Refrigeration*, Aug. '56.

Fig. 2—Valves removed for inspection (and repair, if necessary). Parts visible are covers, valve assembly, and spiders which hold the valve assembly units in place under the covers. Note wood blocking in motor pit at background. This prevents counterweight from turning or moving machine while under overhaul.

Fig. 3—Maintenance foreman Bill Selof and plant engineer Chas. Winkelmann inspect rings on high pressure piston. Other parts on truck 201 are the cylinder head with its two cushioning valves, and the crosshead wrist pin. On truck 504 are the metallic rod packing, crank bearing and cap, the crosshead, and connecting rod. To right of trucks is the taut wire pedestal used at the head end of the high pressure cylinder.

Overhaul Procedure

Outlined hereafter are dismantling, realignment, and reassembly steps followed in this plant in connection with these machines. The application in this case pertains to a high pressure cylinder only. Similar steps would be followed in performing the same work on the low pressure cylinder.

Dismantling

Procedure followed in taking down necessary parts of the compressor, are as follows:

1. Locate chain falls above the head end of the cylinder for cylinder head and piston removal, and a second set of falls over the crank area for removal of connecting rod.
2. Remove valve covers, spiders and valve assembly which consists of the valve seat, strips of ribbon steel (feathers) and valve guards (See Fig. 2).
3. Remove the head.
4. Draw the piston, leaving rod intact in the crosshead. (In these machines it is possible to remove the piston without the rod. Leaving the rod eliminates the possibility of "threading effect" in the cylinders. Removal in this manner is a feature of this machine).
5. Pull the rod.
6. Remove packing from double seal housing. There are two sets of packing. At the compressor end, the set of metallic packing consists of bronze rings. At the frame end, the packing consists of babbit metal rings.
7. Remove the crank case and crosshead covers.
8. Remove wrist pin and crank bearing cap. Then the connecting rod.
9. Draw out the crosshead (See Fig. 3).
10. Spot the machine in such a position that the crank pin is clear of center alignment, blocking the motor shaft in such a manner that the counter weight does not endanger personnel engaged later in cleaning crank case or other work on the machine.

Inspection Procedures

Micrometer readings are then taken in the cylinder to determine wear since last overhaul. Log and compare these readings with previous annual overhaul notations.

Take micrometer readings on cross-head and slides to determine excessive wear or taper (Log and compare).

At this point in the alignment proceedings, the engineer or mechanic must determine if the crosshead slide surfaces are parallel, for the center line through the crosshead area will determine whether or not the cylinder is misaligned. If the slide surfaces are parallel, then the maintenance force can proceed with checking the cylinder alignment. If the surfaces are excessively out-of parallel, it will be necessary to have them machined to make them parallel (matching) before proceeding further.[2]

[2]This operation is somewhat detailed—a short story in itself—preventing description here.

'ignment Method

At this point, the unique alignnent method employed by the chief engineer and his maintenance personnel in this plant is brought into play. It could be called "an electronic device for center-aligning accuracy". It is said to eliminate human error which is inherent in the feel or touch methods employed by many maintenance men. As in other methods of micrometer gauging and aligning, the taut piano wire is used to plot the center line through the machine. The wire is centered with regard to its position through the cross-head area.

The practice in this plant is to hook up a three-volt battery, a set of ear-phones, and the piano wire in series. The steel wire is insulated from the pedestals which support it. One end of the ear-phones is grounded to the machine under overhaul. The micrometer is used to furnish the necessary contact between the taut wire and the cylinder surfaces. When the micrometer touches both cylinder or slide surfaces and the wire, it registers a discernible click in the ear-phones. By use of the low voltage, an accuracy to within 0.0005-in. can be achieved, whereas the average mechanic with ever so light a touch would do well to come within this accuracy. This is particularly true when working in the frame end of the cylinder where the readings must be taken by reaching through valve ports, or with extension handle on the micrometer gauges.

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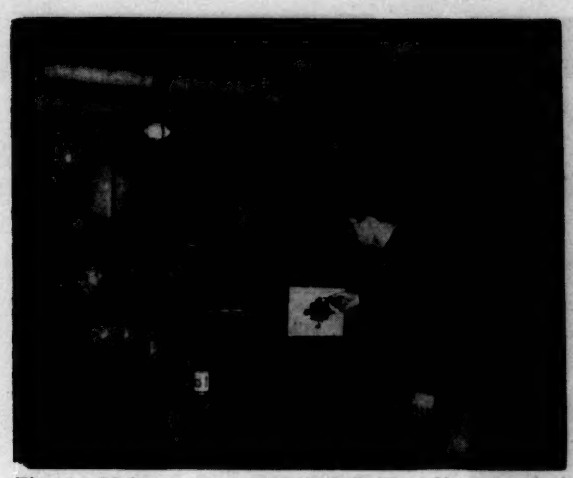


Fig. 4—Maintenance man Bill O'Reilly adjusts vertical position of taut wire as Foreman Selof positions it by means of "electronic" device from eight reference points on the crosshead slides. The dry-cell on the machinery base powers Selof's earphones.

Fig. 5—Positioning the center-line wire from the slide surfaces. Micrometer gauge serves as "switch" to close simple electric circuit, but accuracy to within 0.0005-in. must be achieved for the "switch" to function.

Setup of the Alignment Devices

Two pedestals fabricated out of small angle iron stock are bolted to the engine room floor at either end of the machine (See Figs. 3 and 4). Each pedestal is equipped with a plate and circular opening with a four-way screw adjustment device for positioning and holding the taut steel wire. After pedestals are firmly bolted in place, the wire is threaded and drawn taut.

As previously noted, the "electronic" rig is used to position the wire on center through the cross-head travel area (Fig. 5). Once the parallelness of the slides is determined, they are used as reference points at each end for positioning the wire. A minimum of two readings are taken at each end on each opposing slide, giving a total of four reference points at each end of cross-head travel. Readings should all match (See Fig. 6).

Using the same method or procedure, micrometer readings of the cylinder is then taken at both ends, only using the piano wire as the reference point. Difference in readings between the wire and cylinder at four quarter segments of this circumference will indicate where the cylinder is misaligned. (See Fig. 7).

Readings are Taken

Several sets of readings are taken by different personnel, each set as a verification of the preceding readings. If readings differ greatly, the micrometer readings are started over again from the original cross-head slide reference points to determine that the wire has not been disturbed. Even when cylinder readings are considered final, the procedure is retraced to verify all steps.

When the degree of misalignment is determined, steps are taken to adjust the cylinder pedestal and frame flanges to compensate or "true-up" the cylinder. Shims are inserted to thickness and at location indicated, and then pedestal bolts and frame flanges are tightened. Another set of readings are taken to make certain that securing of these anchor points does not again draw the cylinder out of alignment. When all readings in the cylinder taken from the taut wire as a reference point, match, then the cylinder is considered aligned. Reassembly of the machine can proceed.

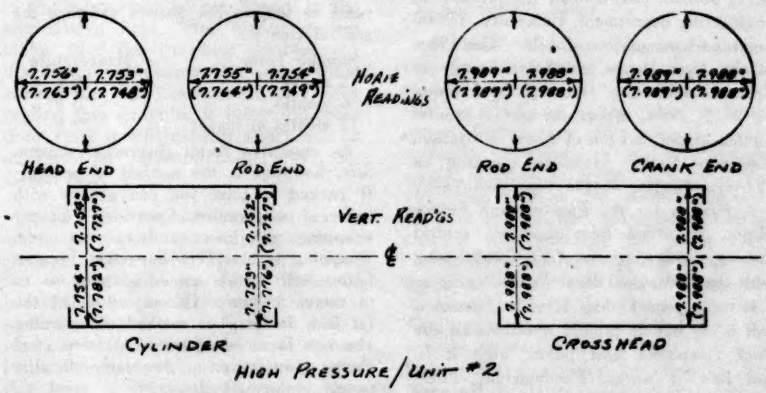


Fig. 6—Sketch used on the Company maintenance record to log readings taken in cylinder and slide at alignment completion time. Figures in parentheses are the micrometer figures taken when machine is first dismantled; before alignment.

Reassembly

After completing other items of inspection required by the overhaul procedure, such as cleaning traps, filters, changing oil, reassembly proceeds by reversing the steps outlined in the dismantling making sure to reset piston clearances to manufacturer's recommended settings.

After assembly, another dial gauge test is made on the piston rod, backed up by micrometer readings, to make a positive centering of the cross-head. Shims are adjusted between cross-head and slipper until rod follows positive center line travel. New packing, of course, is inserted in all glands as may be required.

Startup Steps

Atmospheric valves are closed and air is removed from the cylinder with pump-out machine, discharging the air to atmosphere. A pressure test is put on the cylinders with NH_3 immediately after pump-out, up to working pressures. If all joints prove

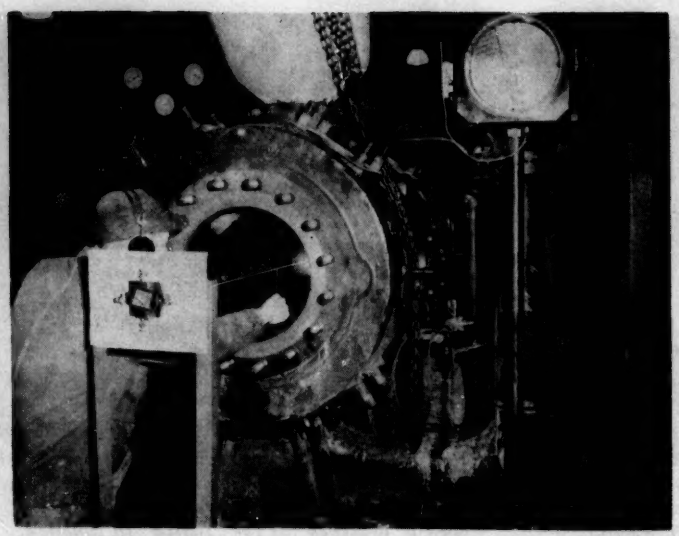


Fig. 7—Micrometer gauge readings of the high pressure cylinder from the taut wire. A click in the mechanic's earphones denotes contact with wire and cylinder wall. Four-way adjustment for the wire is clearly pictured on pedestal plate. Taylor 24-hour recorder in upper right plots operating discharge temperatures when machine is on the line.

gas-tight pressure is released down to approximately 0 psig (not to vacuum), if machine is to stand. If compressor is to go on the line, start-up follows gas-tight test.

Post Overhaul Measures, Precautionary Checks

At time of start-up and run-in period, caution is taken against excessive temperatures, on bearings, rods and packings. The oil system is watched closely and moving parts observed with greater care. An additional man to the watch engineer stays right on the machine for the first day to specifically check all friction points for excessive heats. When the Chief is satisfied that the compressor is functioning satisfactorily the special watch engineer is again detailed to other assignments. Management is notified that the machine is back in operation.

Photography Kibitzer

Pictures for this article were by IR staff photographer. When another staff member suggested that the chief engineer might be a handicap with his suggestions to our flash bulb artist, he was informed that the chief's help was not only welcome, but desired. It turned out that the ready and willing photo-kibitzer is no slouch as a photographer. He had just won another honorable mention for the "Picture-of-the-Week" award by the Chicago Sunday American, January 20.

Down-time is normally a work-week, for a day-time maintenance gang of three men. In emergencies, the work of alignment can be shortened, but hasty readings may result in serious consequences. And, a three-man gang permits flexibility for other interrupting emergency service or trouble calls, which seemingly pile up or wait on the start of a major overhaul period.

Heat Pump and Solar Energy In Space Conditioning

HEADING a trio of speakers on space heating topics at the 19th Annual American Power Conference, Hotel Sherman, Chicago, on March 27-29, will be R. C. Jordan, chairman of the mechanical engineering department, University of Minnesota, whose subject will be "The Place of the Heat Pump and Solar Energy in Space Conditioning." He will be followed by W. R. New, supervisor, special studies section of the division of power utilization, Tennessee Valley Authority, speaking on "Electric Heating in the Tennessee Valley —A Pattern for the Future," and Sidney Miner, industrial sales manager, central district, York Corp., on "Air Conditioning with the Compound Heat Pump."

It is expected that Miner's discussion will bring out or prompt questions on the York compound heat pump, what it is, and how it works. Fundamental differences in its use as compared with conventional fuels will probably be an important aspect of the presentation. It is expected that Miner will go into the economics of the heat pump operation.

NAPRE

Question Box

The National Educational Committee, NAPRE, answers monthly in this column, operating problems forwarded by members. The Committee appreciates answers from the field. Address questions and answers to Prof. Harold P. Hayes, Dean of Engineering, State Polytechnic College, San Luis Obispo, Calif.

Butter Storage Temperatures Asked By Aussie Readers

QUESTION NO. 1155. There is a great deal of controversy going on in Australia at the moment in regard to storing butter at minus 5 F for better keeping qualities. Some persons in Australia say that this is the general temperature of butter kept in cold storage in U. S. A. Both in Australia and New Zealand the general temperatures for storage of butter for local and export requirements is from 10 to 15 degrees F. We have found over the many years that this gives satisfactory results, and there is no deterioration in the quality of butter.

However, as this question has been raised from time to time in Australia, it might eventually become a standard practice for butter to be stored at lower temperatures, the same as reported in U. S. A. If you could supply us with bona fide information in regard to what temperatures butter is stored at in U. S. A. it would be very much appreciated.—J. W. M., Brisbane, Australia.

ANSWER: General practice followed for long term storage of butter in the U.S. is at minus 20 F. At that temperature it will keep in perfect condition for three years or longer. For shorter shortage the general rule is:

Storage Term	Temperature
8 weeks	15 F
6 months	0 F
12 months or longer	−20 F

An important factor governing temperature, however, is the method of packing. If packed in tubs, you can get by with higher temperature, provided proper wrapping, interliners and care is used. Wrapping is also very important because butter will shrink unless wrapped so as to retain moisture. Decomposition of the fat is a factor. The method of churning also is a factor since use of stainless steel churns may impart a detectable metallic taste.

In this country, butter is packed in 60-lb cubes wrapped in a heavy overliner (coated inside), plus a paper liner of paraffin type, and then stored at minus 20 to minus 22 F.

A vast amount of butter has been stored in this country by the USDA, much of which was stored some three years or longer and the standard temperature is around minus 20 F. For additional data contact the USDA, Washington 25, D.C. and The Refrigeration Research Foundation, 12 North Meade Avenue, Colorado Springs, Colorado.—E.R.C., Industrial Refrigeration.

Seeks Heat Transfer Data For Various Finned Coils

QUESTION NO. 1156: Where can I find information published on heat transfer through finned tubes? Data sought is for tubing manufactured with a serpentine type fins, and for varying space dimensions between the fins.

(a) Steel tubes with steel, copper and aluminum fins.

(b) Copper tubes with steel, copper and aluminum fins.

(c) Aluminum tubes with steel, copper and aluminum fins.

—B. B. B. Lashkar, India.

ANSWER: Data you request are difficult to obtain. For an excellent discussion of the fundamentals of extended heat transfer surfaces (finned surfaces) I recommend PROCESS HEAT TRANSFER by Kern, published by McGraw-Hill.

Because of the large number of variables involved in extended surface heat transfer, I would advise you to rely mostly on your own basic test data. In rating a coil, I would establish at least one or two performance points by test before relying on calculations (regardless of additional data available).—H. P. Hayes.

Does Lubrication Additive Help Reefer Machinery Life?

QUESTION NO. 1157: Before we go off the deep end and possibly ruin some ammonia compressor equipment perhaps you can advise us on the use of colloidal graphite in the lubrication systems of both booster and high stage units. We have recently received literature on the use of this material in the lubrication of machinery in the automotive field. The manufacturers claim that the graphite doubles the life of the equipment. We wrote them asking for their experience and they replied that graphite is inert and from their tests it will neither affect nor be affected by ammonia.—R. W. F., Green Bay.

ANSWER: Graphite is used in oils and greases, and in many applications serves a good purpose. The theory behind the use of graphite for aid in lubrication is that it is presumably adsorbed on metal surfaces. This layer of graphite has a tendency to absorb oil and to be wetted by it, thereby favoring the stability of a thin layer of lubricant. Depending upon the nature of the graphite used (amorphous, flake, crystalline) reduced wear is anticipated. Its application is normally in steel mill greases, lubricants for forging tool dies, brake cable greases, automotive spring lubricants, pipe thread lubricants, as well as many more.

The use of graphite in a refrigeration lubricant would not be recommended. One of the main reasons for this is that when graphite is suspended in the oil it has a tendency to settle out. No doubt, the intermingling of the lubricant and refrigerant would hasten this separation. At any rate one could anticipate the graphite would settle out in the lines or such locations as expansion valves or other restrictions, causing plugging of the system.

The manufacturers of refrigeration lubricants go to extremes to eliminate extraneous materials, such as water and solids, from this type product. The addition of graphite, no matter how fine, would undo the special care given to these lubricants.—I. Pollock, Technologist, The Texas Co.

Worried About Corrosion In Aluminum Coil For NH_3 Plant

QUESTION NO. 1158: Our firm recently installed a new system which has six large blower coil units. Piping in these units is all aluminum.

From my past experience in the service field it was considered important to avoid the use of ammonia in methyl chloride systems. Since reading Question No. 1111 and the answer by J. A. McI. in the June issue of Industrial Refrigeration, I am now wondering whether or not the use of these aluminum blower coils in our ammonia system may lead to difficulty.

Aluminum pipe in the coils themselves does not lead me to believe that we should use any inhibitor, or that the alkaline ammonia would corrode them. My concern is over the soldering acids and other chemicals used in the construction and testing of the refrigeration system. Is there sufficient acid in soldering materials that could be carried into these coils or reside in them from their manufacture, which would result in corrosion? Since I recommended the coils, I would feel responsible if corrosion of this nature would take place.—A. J. O., Springfield, Mass.

ANSWER: You have reason to be concerned about corrosion which might result in "pin-hole" leaks. It is possible to produce an aluminum system which will be entirely satisfactory when charged with ammonia. However, to do so requires special attention to neutralizing the acids, flux, etc., used in the soldering operations. In general, the sooner the system is charged with ammonia the better your chances of a leak-free job. This is because the ammonia itself will help to neutralize the acids used in the assembly process. The system you have installed may be entirely satisfactory but I would give it a little extra observation in checking for leaks.—H. P. Hayes.

Wants "Eutectic" Defined

QUESTION NO. 1159: Can you give me a simple explanation of the meaning of "eutectic"? I have seen it used in discussion of brines and also in welding applications. What is the basic principle of a eutectic?—J. P. W., Chicago.

ANSWER: It is preferred to avoid discussing eutectic in general because the answer would be too detailed. However, this answer will explain what a eutectic brine is and from this it may be seen how the eutectic concept can be applied to metals.

A solution of any salt in water has a certain concentration at which the freezing point is lowest. A solution of this concentration is called a *eutectic mixture*. The corresponding freezing point is called the *eutectic temperature*.

The interesting thing is that a solution at any concentration other than the eutectic will start to freeze at a higher temperature. As freezing takes place, either the salt or pure water will be frozen out (depending upon the circumstances), and the concentration of the remainder will change until the eutectic concentration is reached. Final freezing takes place at the eutectic point. For calcium chloride brine, this point is minus 59.6° F.

This principle can be applied to molten metals if solidification is pictured as corresponding to freezing of a brine.—H. P. Hayes.

Asks Simpler Definition On Force Exerted By Ice Lense

QUESTION NO. 1160: Thank you for the opportunity to review in advance of publication, the answer to question No. 1147 (The "Why" of Floor Heaving). I am frank to admit that N. S. lost me early in the answer. Maybe an explanation of some of the mathematical formulas would help.

I think, too, that there must be some way of analyzing this problem by comparing it to some better known principles. For example, isn't it essentially the same thing as heating a receiver completely filled with liquid? How about comparing it to a mercury filled thermometer at temperatures below the freezing point of mercury?—E. F., Venemann Chapter.

ANSWER: Most all readers would agree that the expansion or contraction of a substance can produce great forces. When these forces do work as in cracking concrete, or cracking the glass of a thermometer, or rupturing a receiver, they have obviously expended energy in doing so.

The question is where does the energy come from? In the case of a heated receiver rupturing, the energy is supplied in the form of heat and we could calculate with fair accuracy the amount of heat energy required. In the case of cracking due to cooling, as with the concrete floor, it is not so easy to see. But suppose *you* had to supply the cold necessary to freeze the moisture and cause the concrete to crack. You would have to produce the refrigeration mechanically and it would cost you energy to do it. Therefore the energy required to crack the concrete

came from the energy you had to supply to produce the refrigeration.

When the cold is supplied by Mother Nature, it is hard to trace the exact source of energy supplied because we don't know exactly how Nature produces cold weather. You can be certain, however, that somewhere there was an energy input in some form even though we can't readily identify it.—H. P. Hayes.

New Question

Lithium Bromide Data Asked

QUESTION NO. 1161: What is lithium bromide and what are its characteristics?—J.B.S., Green Bay.

Inquiry Concerns Electric Eye Principle

QUESTION NO. 1162: Will someone explain in detail the operation and features of the photo electric cell (commonly known as the electric eye)? There is a glass in the sleeve. Without this it will not work and I am anxious to know why.—G.T.C., Hamilton, Ont., Canada.

Plastic Repair of Ice Cans

QUESTION NO. 1163: I have heard of a new development for the repair of ice cans using Fiberglas? Can you tell me something about this? —L.E., Chicago.

Water De-Mineralizers For Ice Making From Hard Water

QUESTION NO. 1164: A friend of mine who attended the Southwestern Ice Manufacturers' Association meeting in Texas last year told me he learned of a process for making ice from hard water by using a de-mineralizer. What is a de-mineralizer and how does it work?—W.R.B., Los Angeles.

Determining Need For And Points From Which To Purge

QUESTION NO. 1165: How can we tell if we have air and non-condensible gases in a system in which there is no automatic purger and on which the head pressure does not seem excessive? What is the best point or points to purge these gases from the system?—J.B.S., Green Bay.

Economic Considerations For Vacuum Cooling Application

QUESTION NO. 1166: I have followed with great interest the development of vacuum cooling in the United States. I now have three questions:

1. What do you consider the minimum tonnage of produce required during the season to make vacuum cooling an economically sound procedure?

2. What would be the approximate cost of constructing a vacuum cooling unit?

3. In this area we have a considerable number of fruit cold storages which are now operating to full capacity. This means that a surplus of refrigeration is available, would you consider, therefore, that the vacuum pump plus refrigeration method would be most suitable?—S.W.P., Summerland, B. C., Canada.

News Notes and Chapter Activities

Chicago Hears Talk on Refrigerant and Water Valves In Industrial Refrigeration

CHICAGO — Staging of condensing water regulators was one of the interesting sidelights to a talk on large refrigerant control valves given at the January 22nd meeting of Chicago Chapter, NAPRE. The speaker was Charles C. Hansen, Chief Engineer, Refrigerating Specialties Company, manufacturers of refrigeration control valves. The talk was amplified by slides of valve cross sections and installations, in addition to a dozen full size valve cutaways of back pressure regulators, refrigerant solenoid valves, and condensing water regulators, up to 3-in. port size.

Hansen emphasized the advancements in control design since his company devised the early motorized shut-off (valve manufactured in the 1920's for refrigerant and water control). The trend toward simplification of design, fewer parts, and increased ruggedness was apparent as solenoid valves were revised and improved. In back pressure regulators and condensing water regulators the same trend toward simplification was noted.

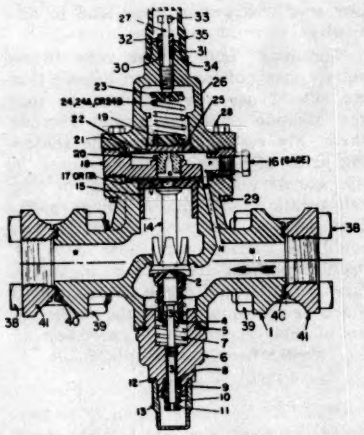


Fig. 1—Section of V-ported internally actuated back-pressure regulator described at Chicago Chapter, NAPRE, in January. Other valve slides shown for discussion of applications and service were pilot operated, combination h-p and electric dual pressure, pneumatically compensated and modutrolled electrically.

Listeners learned that there is a definite difference in attitude which should be taken toward large control valves compared to small ones with regard to maintenance and repair. The small control valves, roughly under ¾-in. size, are generally mass produced in such large volume and are constructed of such small parts that field repairs to the valves are not economically justifiable; for example, it might require a mechanic all day to repair a ten dollar, one-half inch valve. These smaller items are usually best repaired by return to the factory for rebuilding, or else scrapped and replaced by a new control valve.

Large Valves Field Repaired

For larger control valves the attitude is quite different. *First*, the larger valves are produced in somewhat limited quantities and are therefore relatively more expensive. *Second*, they are large and heavy enough to cause considerable difficulty in removing from the line, packing, and shipping. *Third*, the parts are generally large enough and simple enough to be relatively easily cleaned, repaired, or replaced in the field.

Hansen stated that his firm is often amazed to receive for repair a control valve which is mechanically perfect but inoperative due only to dirt inside the valve. The owner of the valve pays many times more for removing, crating, shipping, re-building, re-shipping, and re-installing than the time his mechanic would spend to clean the control valve of inside dirt. Of course, when a manufacturer receives a valve which is merely dirty, he still must put it through a complete rebuilding process and replaces all partly worn parts to put the valve in "like new" condition. The speaker gave the following tips for maintaining and repairing various refrig-

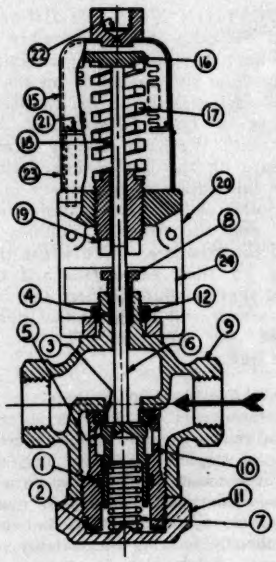


Fig. 2—Water regulator valve section. This type valve is applicable to condensing water systems for both ammonia and some fluorinated hydrocarbon refrigerating plants.

eration control valves: *Back pressure regulators are,* generally speaking, extremely trouble-free-provided they are kept free of dirt; some types require occasional replacement of composition seats. While preventative maintenance is not necessary, an occasional observation of the evaporator pressure gage is advisable as a check on regulator performance.

Solenoid valves must also be kept free of dirt and sludge by maintaining a clean system and by using proper lubricating oil. Except for very aged magnetic coils, electrical burnouts should not occur unless voltage is improper, valve parts are jammed, or the coil is confined to prevent natural ventilation. In the case of a coil burnout, as in the case of a fuse blowout, replacement should not be made without also finding the cause of the failure. Solenoid valves cycling repeatedly and frequently should be disassembled yearly for inspection of wearing parts and seats. On normal refrigeration applications, however, inspection every three to six years should be satisfactory.

Condensing water regulators, handling a relatively dirty and corrosive fluid in comparison to a refrigerant, require more careful and frequent maintenance. At least once a year, except where water is very clean, it is wise to take a few minutes to clean sediment, scale, and flakes from the inside of the regulator. Rubber parts should be for brittleness or wear at the same time. Mere flushing of a water regulator will seldom correct a dirt problem because the flushing tends to raise more dirt particles from the upstream sections which are normally stagnant.

Improper Applications Cited

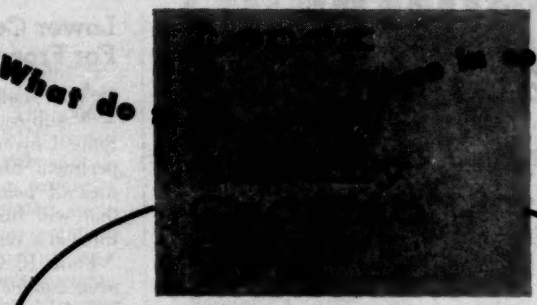
With regard to valve application, Hansen related, the operating engineer is occasionally presented with an improperly selected refrigeration control valve on the contracted installation. A period of operation reveals that proper trouble-free performance is not occurring. In such situations, rather than condemn the valve, checking with the manufacturer will often reveal remedies whose cost will be justified by savings within a few months.

For example, a single pilot-operated condensing water regulator required to control condensing pressure at 5 percent of normal refrigeration compressor capacity might tend to hunt, with resultant waste of water and power coupled with water surging noises. Replacement of such an installation by two or three water regulators whose pressure settings are staggered to stage regulator operation, will result in smooth economical operation during all seasons and loads.

In conclusion the speaker emphasized that by study of manufacturer's information, operating engineers can economically maintain and repair large refrigeration control valves. In addition, the alert operating engineer can detect and remedy misapplied control valves and thereby improve his plant performance.

A Condensed Catalog was distributed, and specific bulletins covering the controls discussed were available to all who attended. The bulletins contains data on the purpose, installation, adjustment, ap-

(Continued on page 40)



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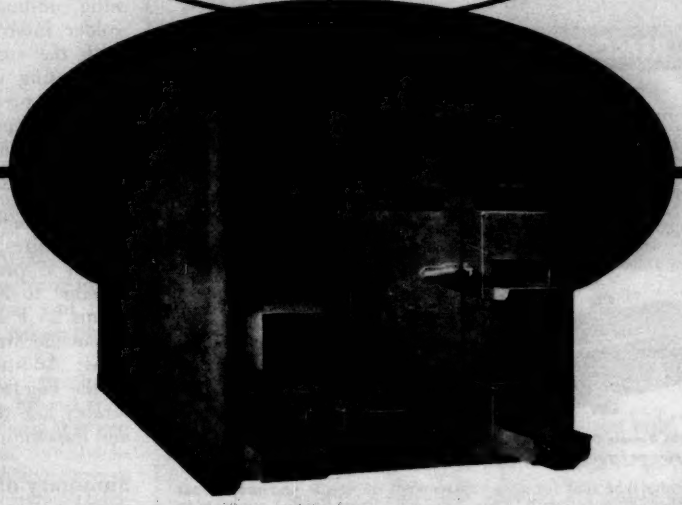

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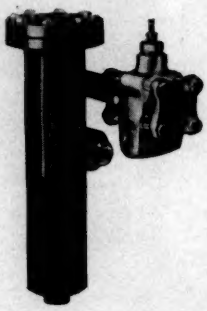
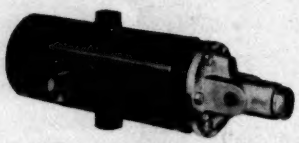
No. 101 Remote Feed Valve with Float Chamber for Ammonia or Freon.

For shell and tube type coolers, large room coils and various types of tank coils. Float with adjustable level located in chamber outside the evaporator; "Level-Eye" with Frost Shield on chamber shows normal liquid level. Capacities to 50 tons for ammonia, 12 tons for Freon.





No. 301 Remote Feed Valve for Ammonia or Freon.

Cartridge-type unit for easy replacement of needle and seat. Float chamber (equipped with "Level-Eye" with Frost Shield) connects to evaporator with balance or equalizing lines. Capacity to 50 tons ammonia and 10 tons Freon.

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Lower Condensing Unit For Frozen Food Cabinets

NEW concepts in frozen food storage cabinets is the subject of a Bulletin issued by the Pennsylvania State University College of Agriculture, Agriculture Experiment Station. The study was undertaken to provide uses of below freezing storage cabinets with a method that will furnish relatively uniform, stable low temperatures at a reasonable cost.

Four 15 cubic foot vertical frozen food storage cabinets, commercial type were used for the test. The standard 1/3 hp condensing unit in each cabinet was replaced by a 1/6 hp unit and all thermostats were removed to allow the units to run continuously.

These tests, according to a report on the study, indicate that a 15-cubic-foot commercial frozen food storage cabinet fitted with a half-sized 1/6 hp refrigerating-condensing unit and a redesigned condenser coil, operating in a usual ambient temperature of 70 to 80 F and running continuously, will provide approximately 20 degrees colder internal temperatures than it will while cycling with the customary 1/3-hp, thermostatically controlled, condensing unit. The experimental evidence also shows that the present modern cabinet equipped with a continuously operating condensing unit of half capacity in an external ambient of 24 F, will provide internal storage temperatures around 45 F below zero.

In view of the experimental evidence that foods in frozen storage maintain their original quality at very low temperatures, a slower decline in quality may be expected if products are kept colder. It appears entirely possible to attain storage temperatures of minus 15 to minus 25 F in a commercial frozen food storage cabinet in outside air to 70 to 80 F with the following modifications: Additional insulation, a redesign of the location of the condenser coil, a smaller refrigerating unit, preferably half the present capacity for continuous operation, and the elimination of the thermostat.

Summary of Report

In a summary of the report, it is stated that results of this investigation, as reported, were of the exploratory type, therefore of a preliminary nature. Other comments are as follows:

Laboratory experiments with a standard type 15-cubic-food cabinet indicate that lower internal temperatures are obtainable, minus 10 to minus 20 F, under usual operating conditions by replacing the customary 1/3 hp thermostatically controlled, condensing unit with a continuously operating half-sized, 1/6-hp unit.

When the experimental cabinets were moved into a 24 F room, the internal temperature of the 15-cubic foot cabinet was found to be very nearly minus 45 F. The cooler ambient served the same purpose as added insulation inside temperatures reflecting outside environment.

Analysis on the basis of total electrical energy used under laboratory conditions indicates that the cost of operation of a continuously operating cabinet on the monthly basis was not any higher than for a standard cabinet of the same capacity.

The most significant contribution in this study is the data presented which shows that a commercial cabinet, with three inches of insulation under continuous operation but connected to half capacity condensing unit, is capable of maintaining food at very nearly minus 20 F under usual conditions and very nearly minus 45 F if it had more insulation. Cost of operation would remain the same.

North Atlantic Chapter Meets

AN important segment of the public refrigerated warehouse industry convened in February for two days at the Shoreham Hotel, Washington, D.C. The North Atlantic Chapter of the National Association of Refrigerated Warehouses began sessions Thursday, February 7, with a panel on present-day industrial relations problems. Legislation of prime interest to the refrigerated warehouse industry was discussed by industry representatives and specialists in such fields as secondary boycott, area-wide bargaining and Federal preemption of states' rights.

A regular business session was held in the afternoon with a tour of Washington concluding the day's schedule. That evening a reception was sponsored by the Terminal Refrigerating and Warehousing Corporation and Merchants Terminal Corporation of Washington, D.C. and Landover, Md. Guest speaker at the banquet following the reception was Calvin Dean Johnson, ex-congressman from Illinois and executive assistant to the vice-president of Remington Rand.

Business sessions were continued on Friday.

Packages For Frozen Foods

HOW much moisture must frozen-food packaging material contain in order to avoid absorption of moisture from the content? In studies conducted by W. G. Brown and C. P. Lentz of National Research Laboratories, Ottawa, Canada, paperboard, white pine, bass sapwood, white oak and other woods were exposed at 0 F. and 98-100 percent rh in air moving at 100-200 fpm. Paperboards reached equilibrium at 10-17 percent moisture content in three to 14 days, white pine and bass sapwood at 19 percent in 21 days, and white oak in about 125 days.

Moisture-absorbing effects can be avoided by preconditioning container materials under the conditions they will be exposed to when in use. Or, since air at room temperature and 80 percent rh is saturated at zero, packages equilibrated in such air will not absorb moisture at 0 F. Time required will vary with the material.—TRRF Bulletin.

Warehouses Receive Safety Awards

THE employees of three public refrigerated warehouses have been awarded citations by the National Association of Refrigerated Warehouses for outstanding safety records of accident-free operation for one year. The National Ice & Cold Storage Company of California, Watsonville, California; Terminal Ice & Cold Storage Company, Nampa, Idaho; and Terminal Ice & Cold Storage Company, Salem, Oregon, have had 55,110, 171,600 and 64,532 consecutive man-hours worked, respectively, without a lost time accident and thus are eligible for the award which is an important facet of the NARW safety program. This program has been in effect since 1952 and has received national recognition for its excellence from safety organizations including the National Safety Council.

Canadian Warehouse Meeting

THE Canadian Warehousemen's Association will hold its 40th annual convention from May 13 to May 16 inclusive, 1957. Convention site selected is the Harrison Hot Springs Hotel, Harrison Hot Springs, British Columbia. All three divisions of the Association, i.e., refrigerated storage, merchandise storage and household goods moving and storage will participate.

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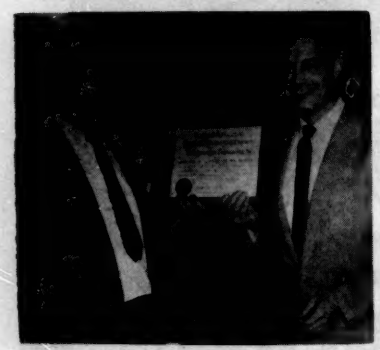
(Continued from page 37)
plication, selection and service pointers for the control described. Hansen was assisted in his presentation by Frank Hunka. Both Hansen and Hunka are Chapter members.—*Bill O'Reilly*

Los Angeles Honors Recold As Guest of Honor

LOS ANGELES—Guest of honor at the January 16, social meeting (Get-away Night) of California Chapter No. 2, was Hal Jarvis, Jr., the representative of Refrigeration Engineering, Inc., a new Industrial Member of NAPRE. Although all new Industrial members were signally honored and introduced at the past NAPRE Convention in Detroit, Los Angeles Chapter reserved to itself the right to present the certificate of membership. Recold's Industrial Membership Certificate was presented to Jarvis by President Victor Stubblefield in ceremonies preceding the social session. Lawrence Benedict, Los Angeles Chapter, Chairman, Industry Relations Committee, welcomed Jarvis into the fold and promised that Recold would be the first of a number of others in this membership category, both on the West Coast and other areas of the country where NAPRE chapters prevail.

Los Angeles chapter's 1957 membership campaign also got off to a good start when W. R. Burnett, chairman of the Independent's team, reported the signing of three new members, who were immediately inducted by President Stubblefield. The new comers are Ralph Smith, vice-

Past-president Clifford P. Scott (l.) and President Victor A. Stubblefield, give official welcome to accordionist June Lynn at Los Angeles Chapter's dinner meeting on January 16.



Los Angeles Chapter president, Victor A. Stubblefield (l.) presents Hal Jarvis of Recold with Industrial Membership certificate at January 16, meeting.

Henry W. Hawkins of Hawkins Chemical Co., (standing) greets some friends at Los Angeles Chapter's Social meeting on January 16.

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president and general manager of Hawkins Chemical Company, Los Angeles, who became the first new member initiated in the 1957 drive; Lou Hall of the Los Angeles Sheet Metal Products Company; and Jack Ritchie of Bender Machine & Engine Company, Vernon, Calif. No other business or technical matters were on the agenda in accordance with long custom as "Get Away Night" is dedicated largely to an entertainment program.

Ed. I. Nelson, chairman, entertainment committee, came through in usual style. A social period was enlivened by the singing and playing of a charming blonde accordianist, Miss June Lynn. A meatballs-and-spaghetti dinner followed, after which the membership was entertained with a series of three colored films of unusual interest: "Pan Americana", "Alaska", and "Sound and The Story (the making of recordings)."

Appoint More Executives

In addition to the officers elected and functioning as the chapter executives at the January social, the board members were introduced and key committee chairmen appointed.

The new board of directors is composed of L. H. Benedict (chairman), N. P. DeSantis, Joseph Granger and Don F. Green. Past-presidents Clifford P. Scott (Chairman), Elmer A. Johnson, and Frank Eccleston, comprise the new advisory board. Chairmen of the 1957 standing committees appointed by Stubblefield are: Educational, Frank Muzzy; Entertainment, Ed. L. Nelson; Membership, W. R. Burnett and Frank Eccleston, co-chairmen. (Burnett will lead the Independents Team and Eccleston the Union Ice, Calif. Consumers Team in the 1957 membership drive); Attendance, Daniel H. Gorman; Finance, Frank R. Elliot; Employment, Michael Julius and D. C. MacDonald, co-chairmen.—*Fred Herr*

Fuller Heads No. California

SACRAMENTO—Election of officers for California No. 3 Chapter was held at their regular meeting on December 13. Officers elected for the coming year are: President, Merle Fuller, Crystal Ice & Cold Storage Co.; Vice-president, Leonard Davies, Safeway Stores; and, Secretary-treasurer, John Mullin, National Ice & Cold Storage Co. Charles Hatler was appointed official reporter for the chapter. He is with Pacific Tel. & Tel. Co.

At the November 29 meeting, the chapter on Condensers from Basic Refrigeration provided the topic for discussion. Chapter president (then) Bill Nichols and Angus Woodruff, educational instructor, guided the discussion.

The chapter meetings are held in Building T-3 of the Sacramento Junior College from 7:30 to 9:30 p.m. the 2nd and 4th Thursdays of each month. New members accepted into the chapter at the November meeting were Frank E. Simpson, Metropolitan Refining Co., James Moore and V. L. Todd of State of California Dept. of Public Works and Buildings, and Thomas Duncan, Sutter Hospitals.—*Phillip Bunnell*

Ammonia Regenerators

SAN FRANCISCO—Purification of refrigerants in the system and the prevention of contamination was the general topic of a three-man panel at the January 14 meeting of California Chapter No. 1, San Francisco. The panel discussed why refrigeration charges became impure and dealt with methods used to take out impurities; as well as relating case histories on added costs to refrigerating plant operation with impurities in the system.

Henry Guilmette gave an excellent talk as to how and why impurities get into systems, particularly by moisture from the air due to leaky packing if operating at a vacuum or from pumping out systems for repair. He covered the effect of moisture in "Freon" and NH, systems.

Frank Cordoza distributed cuts of the type of regenerator he uses on ammonia systems to get water and impurities in the oil out of the system, and the proper place to drain oil from the system.

L. Etzel also distributed cuts of the type of regenerator and purge drums the PFE uses. Added costs were shown due to running with lower back pressures on account of impure charges than necessary with an active charge, as well as excessive head pressures due to non-condensible gases in the system. Considerable discussion followed relative to the proper lubricating oil to use and the practicability of refining of oil after it has been drained.—*L. Etzel.*

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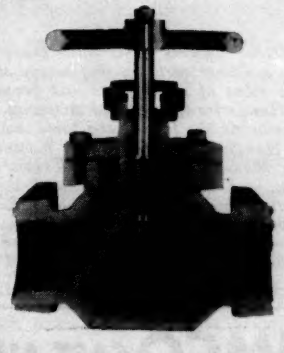

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Chief Engineer of Bank Heads Miami Chapter

MIAMI BEACH—New president of the Greater Dade County Chapter, NAPRE, is Peter J. Bergmann, chief engineer of the Federal Savings and Loan Assn. at Miami Beach. Other officers elected for the 1957 term are Vice-president, Wm. G. Robinson, chief engineer of the Parkleigh House Hotel; Secretary-treasurer, Chas. W. Moneypenny, chief engineer, Kenilworth Hotel. Although the past chapter president, Charles M. Haller was designated chapter instructor, he was obliged to decline in view of teaching commitments which conflicted with the chapter meetings. President Bergmann has taken over the educational chairmanship of the chapter temporarily and announced several educational field trips are in the planning. Secretary Chas. W. Moneypenny is substituting as chapter instructor. The chapter continues to carry on its lecture-instruction series on Basic Refrigeration at the 2nd and 4th Wednesday meetings each month. A revision of the By-laws was recently forwarded to the national office with the request that they be approved by the national board.—*C. W. Moneypenny.*

Variety of Operating Topics Keep Green Bay Active

GREEN BAY—Some of the most successful meetings of Green Bay Chapter have centered around panel programs. Another of these meetings took place on December 12. Four of the chapters own members were the panelists. The topics ranged from operating a cold storage plant to refrigerated trucks and back to tunnel freezing. Leo Kusch chief engineer, Atlas Warehouse & Cold Storage, spoke on the operation of the cold storage plant from the supervisor's point of view. George Johnson, operating engineer, also of Atlas Warehouse & Cold Storage, spoke on the same subject from an operator's point of view.

The ins and outs of keeping a fleet of refrigerated trucks rolling was presented by Donald A. Blashe. He also acquainted the members with several types of equipment now being used in the Northern Wisconsin vicinity. Harvey Wishart gave an excellent detailed discussion on the design and operation of a blast freezing tunnel. Harvey had previously written an article for Industrial Refrigeration on the two-stage refrigeration equipment in his plant. This talk was more centered with the tunnel itself where eight million pounds of produce were frozen in four months this past season.

At the same meeting the nominating committee presented their recommendations for officers. Following motions from the floor, the members present elected the following as officers for 1957: President, Leo Kusch, chief engineer, Atlas Warehouse & Cold Storage; Vice-president, Harvey Wishart, Refrigeration Engineer, Larsen Packing Co.; Secretary, James B. Schouten, sales engineer, Bassett Refrigerating Co.; Treasurer, Lavern Zimmer, engineer, Neenah Milk Prod. Co. Directors elected were Lambert Bodart for a three-year term and Amos Vierbicher to fill an unexpired term of one year of James Whitehouse, who had withdrawn, creating the vacancy.—*J. B. Schouten.*

Newly elected officers of Greater Dade County Chapter, NAPRE, were formally installed at a dinner meeting in January at which the members' ladies were guests. The above are some of the officers and prominent members. Standing l. to r. are Jackson, Luscow, Hungerford, Lock and Ammonn. The two ladies standing are Mesdames Luster and Loscow. At the left of the table are members Luster and Newalk with Mesdames Jackson, Hungerford and Newalk between them. At the speakers' table, left to right are Mrs. Moneypenny, Secretary-Treas. Charles W. Moneypenny, President Peter J. Bergmann, and Mrs. Bergmann, and Recording Secretary William J. Taylor. At the right of the table are members Suchy, Rahn and Lundberg, with Mesdames Taylor and Suchy appearing between them. With their February meetings the chapter began holding refrigeration classes at Eastern Air Conditioning Company, 511 Southeast 72nd. St., on the 2nd and 4th Wednesdays of the month.

Welding Demonstration

TULSA—Two meetings of the Tulsa chapter were held in two consecutive weeks to start the new year. The first meeting was for the installation of officers elected in December. The second meeting held on January 15 featured instruction and demonstration on brazing, welding and cutting of various metals. The Linde Air Products Co. sponsored this demonstration and their local representatives lectured to the members on proper procedures. Later each member was given an opportunity to try his hand at some of the simple mechanics of cutting and welding.

Results of the Tulsa Chapter election held on December 18 are as follows: President, James Kenneth Imel, chief engineer, Mayo Hotel; Vice-president, George Koehne, chief engineer, Tulsa Cold Storage; 2nd Vice-President, George D. Hughes, Glencliff Dairies; Secretary-Treasurer, Henry Turner, Beatrice Foods and Sergeant-at-Arms, Oliver Henderson, engineer, Mayo Hotel.—*B. J. Swadley.*

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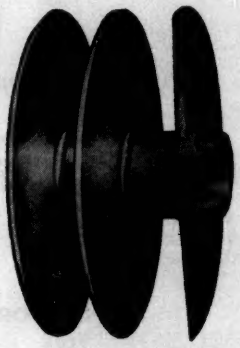

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Puget Sound Chapters Re-Schedule Meeting

TACOMA—December meeting, planned for a joint affair with Seattle and Olympia Chapters, was to have been held at the Heidelberg Brewing Co., with the President of the chapter at that time and Chief Engineer at Heidelberg, Archie Waterbury, making the arrangements. The Brewery planned to serve a Dutch lunch. On the day of the meeting an unexpected snow storm cancelled out the well laid plans. This special meeting has been rescheduled for March 6, at 7:30 p.m. with Olympia and Seattle again being Tacoma's guests.

Regular January meeting was held in the Fireplace Room of the Tacoma Public Library with the Chapter's new President, Merle Halley, presiding. Morten Paulson, who was voted into the chapter in November but unable to be present at that time, was initiated as an active member by former President Waterbury. Paulson is Chief Engineer of the Auburn General Depot, U.S. Army Cold Storage Facility, Auburn, Washington.

Educational portion of the January meeting was by the Seattle Office of York Corp. Three films were shown. One on York Turbo-Compressors, showing the history of the machine dating back to its original manufacture in Switzerland, along with its construction and operating characteristics. Uses of Refrigerants-11,-12, and -114, depending on the tonnage involved were explained. It was also pointed out that the "Turbo-Matic" is a newer version with tonnages as low as 100 tons, using Refrigerant-11. The second film was entitled "Selective Refining" and showed how York blended their own refrigerating oil. The third film covered York VW compressors. A discussion period on the above films followed.

Phil Gilmore, former secretary of the chapter who was transferred to Portland last summer, was present for the meeting. He is now an assistant chief engineer for the Northwestern Ice & Cold Storage Co., parent company of Pacific Refrigerating Co. of Tacoma where he was chief engineer. Phil works under L. I. Mills who is also a member of the Tacoma Chapter; in fact, Mills was one of the charter members of this chapter, and a former National Director.—*Jim Bennett.*

Ft. Pitt Installs Officers

PITTSBURGH—Newly elected President Clyde Dalton was presented to the members and guests on December 12 at the chapter Christmas party. This social, held instead of the regular meeting, provided an opportunity for some of the charter members of the chapter to participate in the installation of the new officers. Charter members Andrew Singer, James Moore and Louis Mantz were present along with some of the other senior members of the chapter who hadn't been out since the last Christmas party.

New officers installed in addition to Dalton who is assistant engineer, Pittsburgh Brewing Company, were: Vice-president, James A. Crenner; Secretary-

(Continued on page 46)

Air conditioning or refrigeration systems represent a large investment — yet their efficiency hinges in large part on the performance of the cooling tower. Keenly aware of this key role played by the cooling tower, engineers take care to select one that is consistent in its ability to deliver cold water at specified temperature and volume . . . at an economical price per gallon.

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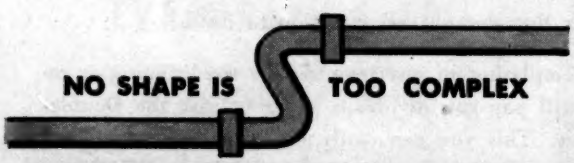

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Salmonella in Eggs

REFRIGERATION of fresh eggs has an important bearing on the extent to which Salmonella organisms are found in frozen and dried products. These bacteria are significant in public health and will continue to be sources of food illness until they are thoroughly understood and practices that control them are used effectively. At the Western Utilization Research Branch in Albany, Calif., J. L. Stokes, W. W. Osborne, and H. G. Bayne have recently conducted research on penetration and growth of Salmonella in shell eggs.

The importance of these studies lies in the demonstration that effective refrigeration is the means of controlling Salmonella, and if all eggs used in the manufacture of frozen and dried products were properly handled, this problem would be controlled. The same could be said for all eggs — however used subsequently.

Refrigeration below 50 F effectively stops Salmonella organisms but it must be applied quickly. Shell infection penetrates the egg membrane at higher temperatures, slowly at first, but within a week, infection can be started internally. In the tests, penetration took place within the first week at the experimental temperature of 84 F. This rate would be reduced at any significantly lower temperature of 84 F. This rate would be reduced at any significantly lower temperature and increased up to a maximum slightly above 100 F. The important effort should be to arrest the activity of the micro-organisms before they penetrate the shell membrane, and then to hold them at customary cold-storage holding temperature, where, in fact, shell contamination actually dies out.

In sharp contrast, Pseudomonas and other bacteria invade eggs rapidly at 50 F. Control of rot requires strict sanitary measures and is the chief reason for much effort at washing eggs. Salmonella organisms do not produce rot but may be found subsequently in frozen or dried products.—TRRF Bulletin.

Study on Cooling of Hot Beef Carcasses Released

AN EXHAUSTIVE investigation of the cooling of hot beef carcasses which revealed that "dry" coil equipment will give equal or better performance than brine spray is being offered in printed form through Refrigeration Engineering, Inc. of Los Angeles.

The study, titled "Hot Carcass Coolers. . .Brine Spray or 'Dry' Coil" was prepared by D. D. Wile, vice-president and chief engineer and H. A. Halls, national service manager, Refrigeration Engineering, Inc. Presentation of the paper by Mr. Wile was featured at the recent golden anniversary meeting of the American Meat Institute in Chicago.

One of the highlights of the speech pointed out that the shrinkage of carcasses is due mainly to the temperature difference between the coil and room; and adding moisture artificially, such as in a deep-water pan, will not reduce shrinkage. Also brine sprays at a temperature equal to "dry" coils will actually cause greater shrinkage than the dry coil.

Another important point illustrated in the study is that ceiling coils give proper air distribution by putting a blanket of cold air at the ceiling, which brings the rump of the beef in contact with the cold air first, and tends to cool the carcass evenly, reducing slime and sour bone.

The difference in maintenance and operating costs between brine and dry coils is also discussed in detail and it is revealed that the deterioration and up-keep of rails, switches and hangers is excessive in a brine spray installation and that the cost of brine is not a minor factor.

New Refrigerator Car Under Study

AN experimental refrigerator car of radical new design is now being studied by Pacific Fruit Express Company. The new type car, built by Electro-Motive Division of General Motors, has a semi-floating mounting of the car body to cushion the load, and the entire body is removable.

The car is now being operated on Southern Pacific lines, according to K. V. Plummer, vice-president and general manager of PFE. Mechanically refrigerated, it is capable of maintaining temperatures ranging from 0 to 70 F. When desired, air is circulated around the load by two fans installed in the ceiling.

COMING CONVENTIONS

SOUTH CAROLINA ICE MANUFACTURERS ASSOCIATION
March 13-14, 1957
Wade Hampton Hotel
Margaret Kinder, Secretary

NORTHWEST ASSOCIATION OF ICE INDUSTRIES
March 14-15, 1957
Victoria, B.C.
L. F. Marsh, Secretary

NORTH CAROLINA ICE ASSOCIATION
March 18-19, 1957
Washington Duke Hotel, Durham, N. C.
Lewis H. Powell, Secy-Treas.

THE REFRIGERATION RESEARCH FOUNDATION
March 30-April 2, 1957
Chalfonte-Haddon Hotel, Atlantic City, N.J.
H. C. Diehl, Director

AMERICAN WAREHOUSEMENS ASSOCIATION
April 1-5, 1957
Chalfonte-Haddon Hotel, Atlantic City, N. J.
Wm. Dalton, Secretary

NATIONAL ASSOCIATION REFRIGERATED WAREHOUSES
April 1-5, 1957
Chalfonte-Haddon Hotel, Atlantic City, N. J.
Wm. Dalton, Executive Vice-President

GEORGIA ICE MANUFACTURERS ASSOCIATION
May 5-6, 1957
Henry Grady Hotel, Atlanta, Ga.
Mildred Nichols, Secretary

AIR CONDITIONING & REFRIGERATION INSTITUTE
May 5-8, 1957
The Homestead, Hot Springs, Va.

CANADIAN WAREHOUSESMEN'S ASSOCIATION
May 13-16, 1957
Harrison Hot Springs Hotel
Harrison Hot Springs, British Columbia

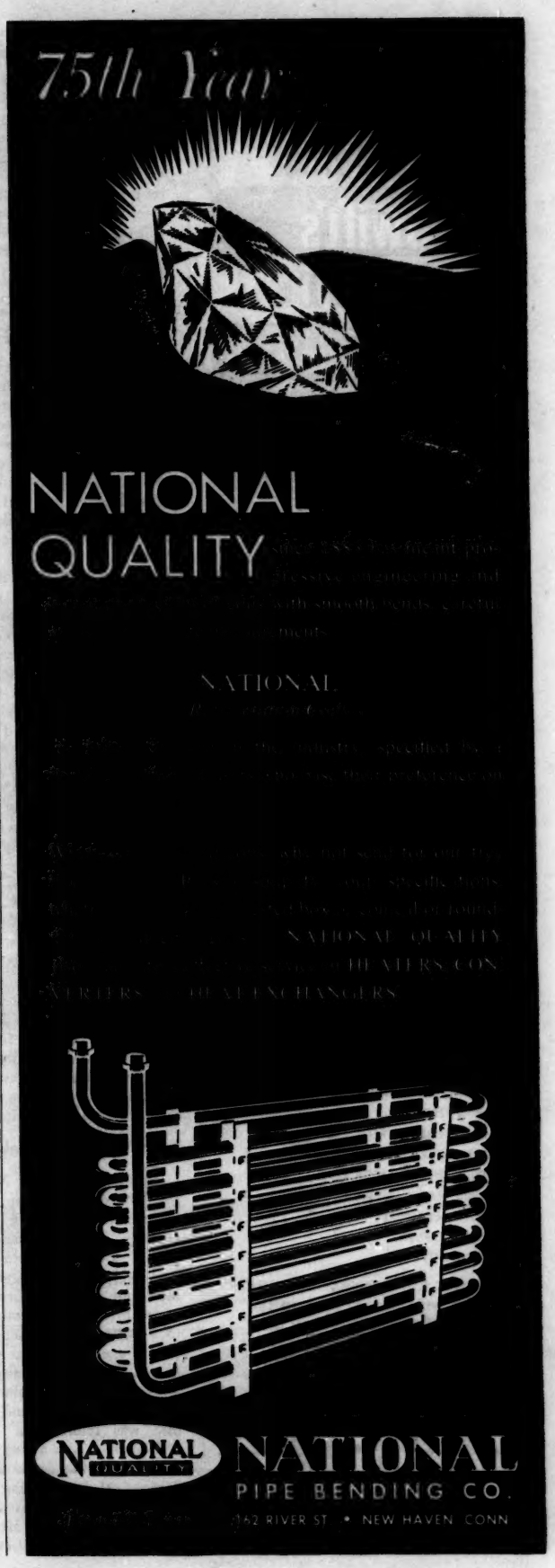
AMERICAN SOCIETY REFRIGERATING ENGINEERS
June 2-5, 1957
Hotel Fountainebleau, Miami Beach, Fla.
R. C. Cross, Executive-Secretary.

EASTERN SEABOARD APPRENTICESHIP CONFERENCE
June 5-7, 1957
The Marshall House, York Harbor, Me.
Cyril M. Joly, Chairman

WESTERN PLANT MAINTENANCE & ENGINEERING
June 11-13, 1957
Civic Auditorium, San Francisco, Calif.

AMERICAN SOCIETY OF REFRIGERATING ENGINEERS
November 14-16, 1957
Shoreland Hotel, Chicago
R. C. Cross, Executive Secretary, New York City

NATIONAL ASSOCIATION PRACTICAL REFRIGERATING ENGINEERS
November 18-21, 1957
Hotels Del Prado & Sherry, Chicago
J. R. Kelahan, Secretary



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8. MOLD RESISTANCE
9. FIRE RETARDANT
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(Continued from page 43)

Treasurer, Otto P. Knoch, chief assistant, Hornes Dept. Store. Chairmen of the committees appointed by Dalton are Alfred Lossing for Education. Lossing is chief engineer of Pittsburgh Brewing Company. Chairman of the membership committee is Edgar L. Kenney, sales engineer for Anchor Packing Company. Entertainment will again be headed by Thomas Knoch and Ed. Tessmer who made such a success of the Christmas party.—*Otto Knoch.*

Refrigerated Enclosures Mid-South Topic

MEMPHIS—Following the Guy R. King course, Chapter 16, instructor H. L. Todd lectured on refrigerated enclosures at the second January meeting of Tennessee Chapter No. 1. He used the blackboard to put over his talk, drew pictures of small refrigerated boxes and figured the amount of coil or blower that was needed to keep the box cold and talked about the refrigerant that was to keep the box cold, and had those members present answer the questions following this chapter.

Among a number of the inquiries received by the Memphis Secretary concerning Question No. 1153, one of the parties who was interested enough to pay a visit to the plant was Sloan Martin, Sales Manager, Armstrong Cork Company. He toured the Mid-South Refrigerated Warehouse Company and looked at the air conditioned vestibule that was installed by NAPRE's past presidents, Clay and Conley. He said he had sold many — many millions board feet of cork for cold storage plants but he had never seen such a perfect job of keeping a vestibule free of ice as this one. He said he would not have believed it was being done if he hadn't seen it himself.

The first meeting of the new year was on January 2. Instructor Todd was absent so President John H. Robinson carried on the educational meeting. His topic was Servicing, Chapter 15, Basic Refrigeration. Robinson used variations of questions from the text for bringing out the important points in the discussion. In order to emphasize certain points he went back and reread them to the chapter adding his own comments and experiences.

Long Standing Members Pass

Tennessee Chapter No. 1 was saddened in December with the loss of two associate members and long time boosters. Partners in the Riechman-Crosby Co., they passed away within a week of one another. These partners were John A. Riechman and Harry H. Crosby. Crosby passed away first, on December 10 at the age of 91. Riechman passed away a week later at the age of 84. For almost 60 years the name Riechman-Crosby Co. has been known throughout the south. The successful machinery and industrial supply firm was founded in 1897.

Riechman was a native of Ohio and at the time of his death was honorary president of the Community Fund and past president of Associated Charities, which he helped to found. He was interested in the Tennessee Children's Home Society and had served as its treasurer. Mr. Riechman was a Lutheran, a Mason, and a member of the Al Chymia Temple, Memphis Country Club, Hunt and Polo Club, Tennessee Club and Five Lakes Club. Mr. Crosby was a native of Indiana and moved to Memphis in 1889. He was a former president of the old National City Bank. He was a member of the Immaculate Conception Catholic Church.—*Chas. Conley.*

Deep South Installs Officers

NEW ORLEANS—Louisiana Chapter No. 2, NAPRE, held its 34th installation of officers at L'Enfants Boulevard Room on Wednesday, January 9, 1957. Installing officer was Frank L. Chase, National First Vice-President, and Mr. Louis Howart assisted Mr. Chase.

Officers for the 1957 term were installed as follows: President, John N. Mariakis, Sr., chief engineer, Claiborne Towers; 1st Vice-President, Joseph Arena, chief engineer, Canal Realty Co.; 2nd Vice-president, John F. Luck, Refrigeration Engineer; 3rd Vice-president, Carl J. Bosse, chief engineer and building manager, Lee Circle Building; Treasurer, George J. Whitman, Partner, Whitman Holloway & Olivier; Secretary, Leo J. Vivien, Executive secretary and engineers examiner, Board of Examiners, Operating Engineers; Financial Secretary, Eugene W. Orth, chief engineer, Georgian, Inc.; Sgt.-at-Arms, Joseph Copley, Sr., engineer, Barq's Beverages, and Educational Chairman, John Funel, service manager, Equitable Equipment Co. Other members of the board are: Joseph P. Vernaci, Marion G. Olivier, E. J. Dumaine, Vernon J. Foret and Fred Thomas, Sr.

Retiring president Damian Fischer (right) presents the gavel to his successor John N. Mariakis at the installation of officers for Louisiana Chapter No. 2 January 9.

Gerald Vieagas and his committee arranged the dinner and dance. Member Al Ballanco's orchestra furnished the music. A crowd of 150 couples attended.

The chapter held their second meeting of the month at the Roosevelt Hotel, in the University Room on January 23, 1957. Professor Thomas Stokes of Cary B. Gamble and Associates, Engineering Firm, spoke on "The Use of Brine in Refrigeration". It was a very interesting subject. Answers were given to the many questions asked.—*Jimmy Chaisson*

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Milwaukee Program For Midwest Regional Meeting

MILWAUKEE—Early in February, Chairman L. J. Anderson, announced details of the Midwest Regional Educational Conference plans for April 26 through 28, 1957. Milwaukee chapter, NAPRE, will be host to engineers, both members-at-large and from the chapters in an 8-state area.

According to Anderson, who is also Secretary of the Milwaukee Chapter, registration will commence on Friday afternoon, April 26. That same afternoon, the Vilter Manufacturing Company has extended an invitation to a number of their customers in the area and NAPRE members to tour their facilities. A reception by Milwaukee Chapter will be held in the evening.

Registration of attendants will also take place on Saturday morning, with the welcoming ceremonies scheduled for 9:00 a.m. The first speaker of the educational program will have as his topic, the operation, inspection and overhaul of a refrigeration compressor prime mover—a synchronous engine-built motor. The speaker will be from Ideal Electric & Manufacturing Company, who will detail the operating and annual overhaul procedures for this electric motor application, using as his model a large horsepower motor driving a refrigeration compressor common to the industry.

The second speaker scheduled will be from the Hartford Steam Boiler Inspection and Insurance Company, who will discuss safety measures in and about the refrigeration plant. He will be followed by a panel of three prominent NAPRE members who will conduct a Question Box session on refrigeration operation and maintenance.

Following the luncheon recess another educational speaker will be presented. Other plans of the afternoon will be given to attendants' choice of field trips to local refrigerating plants, among them very prominent breweries, dairies, ice cream manufacturers and cold storages.

Saturday evening's activities will be given over to a cocktail party and dinner with a short address by a prominent local speaker on a timely industry topic. Dancing will follow the dinner.

A chapter clinic will be conducted early on Sunday morning for chapter officers and attendants. Other members and their ladies are expected to join these officers at a luncheon session following which the conference will adjourn.—L. J. Anderson.

Food Store Adds Storage

HART FOOD Stores, Inc. Rochester, N. Y. will erect an addition to its warehouse facilities for the storage of frozen foods, according to Jack H. Rubens, executive vice president of the company.

Refrigerated Warehousemen Honor Frozen Foods

THE National Association of Refrigerated Warehouses paid special tribute January 7 to the National Frozen Foods Distributors Association and the National Association of Frozen Food Packers, at their annual convention.

Gilbert J. Stecker, president of the NARW, representing the public refrigerated warehouse industry, presented commemorative plaques to the presidents of the two organizations, F. Gilbert Lamb, National Association of Frozen Food Packers, and Richard M. Page, National Frozen Foods Distributors Association.

Mr. Stecker, who is also President of the Merchants Ice & Cold Storage Co., Inc., Louisville, Kentucky, said:

"Although the cold storage industry dates back over a half-century, we have both supported and enjoyed the growing pains of progress with you. During these years of our close relationship, which grows even closer as the months pass by, we have had our problems . . . but we have also had our mutual feeling of interdependency which few related industries have ever felt so acutely.

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give you clean frost-free cold rooms, cut losses!

Thru engineered distribution of cold air and faster freezing rate King Systems cut food processing losses due to frost soil on products, excessive size ice crystals and bacterial activity. Further, you get increased cold room capacity, continuous operation without costly defrosting shutdowns, power and maintenance cost savings. An air movement system designed for your needs, for cold storage, blast freezing, freezing tunnels, storage freezers for all frozen food products.

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Southwestern Program

THE program for an active year of Association service was laid out at a meeting of the new Board of Directors of the Southwestern Ice Manufacturers' Association in January.

The Spring ice sales meeting will be held in Fort Worth, at the Hotel Texas, Thursday and Friday, April 18 and 19. The program for this meeting will be drawn to bring advice, information and inspiration to those who have the responsibility for selling ice on today's ice market.

The Management Conference and the National Association's Regional Conference combined will be held at Waco, at the Roosevelt Hotel, for one full day, forenoon and afternoon, on Friday, May 17. This conference is designed for off-the-record discussions of problems facing those charged with responsibilities for Texas ice investments.

The Conference of Engineers will be held in San Antonio, at the Gunter Hotel, Wednesday and Thursday, October 23 and 24. This will be the thirty-second engineers' conferences that have brought efficiency of production to a high level.

The 67th Annual Convention of the Association will be held in Austin, with headquarters at the Stephen F. Austin Hotel. The dates are Sunday, Monday and Tuesday, December 1, 2, 3, 1957.

The Humble Oil & Refining Company, in its Television program, "Texas in Review", during the week beginning Monday, February 18, gave highlights on the story of the modern ice industry of Texas over 23 television stations throughout Texas. The Association and some of the members cooperated with the oil company representatives in the preparation of what was a fine story on the Texas Ice Industry.

Food and Drug Inspections

WHILE FDA inspectors have broad authority to inspect and sample goods in public refrigerated warehouses, they may not take samples from goods which are under a court seizure order without first obtaining a court order authorizing sample taking. NARW recently investigated this question with FDA officials and was emphatically assured that court seizure orders must be strictly observed by FDA inspectors. FDA also stated that its inspectors are kept informed of all food seizures and should know when a given lot of food is under a seizure order.—NARW Quick Sheet.

Tri-State Kansas Oklahoma Missouri Convention

THE first tri-state convention of the Kansas, Oklahoma and Missouri Valley Ice Associations was held at The Parsonian Hotel, Parsons, Kansas, January 20, 21 and 22. The meeting was well attended, and each area was well represented. Interest was excellent, and the attitude of the delegates was stimulating.

Highlights of the convention included addresses by A. C. Dewhirst, Manager of the Refrigeration Department, Santa Fe Railroad, Chicago, and Guy W. Jacobs, Executive Secretary of the National Association of Ice Industries. C. P. Austin of NAII moderated the Regional Conference Session, and C. R. McCarter of Winfield, Kansas, conducted the panel discussion.

The following officers were elected by the respective Associations for 1957:

Kansas Association

President, C. R. McCarter, Winfield, Kans.

Vice-President, W. E. Brent, Jr., Lawrence, Kans.

Secretary & Treasurer, Matt Scherer, Newton, Kans.

Oklahoma Association

President, Ralph Hood, Guthrie, Okla.

First Vice-president, Leo Land, Duncan, Okla.

Second Vice-president, Bill Addison, Tulsa, Okla.

Treasurer, Clyde Simon, Oklahoma City, Okla.

Secretary-Counsel, Harry Hudson, Oklahoma City, Okla.

Missouri Valley Association

President, R. C. Muckerman, St. Louis, Mo.

Vice-President, Harold Margolin, Kansas City, Mo.

Secretary-Treasurer, V. A. Esphorst, St. Louis, Mo.

New England Ice Meeting

A MEETING of the New England Ice Association was held February 19, at the Kenmore Hotel, Boston. The agenda included a complete report of the National Association's Convention in Atlanta. Plans were made for the ice vending station folders. A report was made on the proposed new National Association movie and general discussion was held on plans for the coming summer and business in general.

Little Giant Model 90M

11 MODELS IN THIS LINE OF ICE BREAKERS FOR:

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The Little Giant Line has a long record of service to many types of users. These breakers are designed to break ice in rice to chestnut to 3" size and pea to chestnut to 4½" size. Hand and power operated. Write for details and prices.

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SPECIFY ACME

. . . The Gas Mask that Gives You MAXIMUM USABLE VISION

Tests prove that ACME gas masks lead the field in giving you clear, undistorted vision—up, down, and to either side. Along with maximum usable vision, you get greater comfort, less fogging, minimum breathing resistance, acceptable conversation transmission—all at down-to-earth prices.

Write for Bulletins No. 501 on gas masks and No. 562 on results of vision tests.

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AWA Convention Exhibit Space Expanded

ORIGINAL exhibit space at the forthcoming convention of the American Warehousemen's Association, offered free and limited to Associate Members of the National Association of Refrigerated Warehouses, a division of the AWA, has been expanded by additional booths to meet the demand, according to Horace W. Wilson, General Chairman of the Convention.

The 66th Annual AWA Convention is being held this year April 1-5 at the Chalfonte-Haddon Hall in Atlantic City, N. J.

NARW associate membership is open to all suppliers and allied companies in the perishable food industry, subject to NARW Executive Committee approval, and offers the associate member, besides free convention exhibit space, reduced advertising rates in the Directory of Public Refrigerated Warehouses, as well as the many regular services of the national association located in the Tower Building, Washington, D. C.

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VALVES
F-12, F-22, AMMONIA

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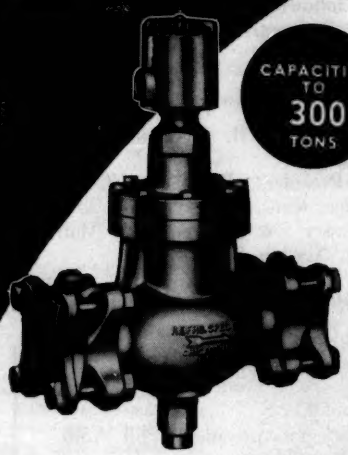
- SUCTION
- HOT GAS
- UNLOADING

HEAVY DUTY
SINGLE COIL
MANUAL LIFT

CAPACITIES TO 300 TONS



AVAILABLE CONNECTIONS ODS	FPT	Welding	Port Size	Tons, Freon-12 Liquid	Suction	Ammonia Suction
7/8, 1 1/8, 1 3/8	3/4, 1/2	3/4, 1/2	3/4	32	5.1	11
1 1/8, 1 3/8, 1 5/8	1	1	1	40	7.0	14
1 3/8, 1 5/8, 2 1/8	1 1/4	1 1/4	1 1/4	60	10	23
1 5/8, 2 1/8, 2 5/8	1 1/2, 2	1 1/2, 2	1 5/8	100	15	35
2 1/8, 2 5/8	2	2	2	140	23	58
2 5/8, 3 1/8	2 1/2	2 1/2	2 1/4	160	25	62
3 1/8, 3 5/8	3, 2 1/2	3	3	300	60	130
4 1/8	4	4	4	.....	90	220
5 1/8	5	5	5	.....	150	370

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R S CONTROLS

Frozen Strawberry and RSP Cherries Pack

EXCLUSIVE of California, the 1956 pack of frozen strawberries amounted to 136,327,580 pounds, according to data compiled by the National Association of Frozen Food Packers. This figure represents a 20 million pound decrease from the 1955 pack in states other than California. California production, which was still in progress in October, was running about 36 percent ahead of last year with a pack of 134.3 million pounds. This means that total U. S. pack has already nearly equaled the all-time high of 273 million pounds in 1955, and will undoubtedly exceed that figure when the California pack has been completed.

The 1956 pack of Frozen RSP Cherries amounted to 88,473,933 pounds, representing a 27 percent decrease from last year's near record pack of 114.5 million pounds. The massive 1953 pack of 115.2 million pounds stands as the all-time high. Packs in both the Midwest and West this year slightly exceeded those of last year. However, this was not nearly enough to offset the sharp 51 percent decrease in the Northeastern pack which resulted from severe weather early in the season. In recent years, this region has accounted for an average of better than 40 percent of the total U. S. pack.

Frozen Milk Retains Quality for Year

MILK can be frozen in plastic bags and stored for as long as 12 months. Studies at Britain's National Institute for Research in Dairying show that milk packaged and frozen in pint, quart and gallon polyethene packs, when melted a year later, "cannot be distinguished from pasteurized milk."

British dairy scientists are also using radioactive isotopes to try and discover how cows make milk. They add the atomic isotopes to materials fed cows, then trace them through to the milk produced. Results to date show that milk fat is made from the acetate and fat circulating in the animal's blood.

Egg Support Discontinued

GOVERNMENT buying of eggs to support market prices is being discontinued. Buying may start again soon but no final decisions on future action have been announced. Egg production will be greater the first six months of 1957 than last year.—NARW Cold Facts.

News of PEOPLE

H. C. DIEHL, Director of the Refrigeration Research Foundation has been appointed chairman of the Fruit and Vegetable Task Group of the Presidential Bipartisan Commission on Increased Industrial Use of Agricultural Products. The group held its first meeting in Washington, D.C. on January 11-12, and is to give its report to the Commission in February. Dr. M. J. Copley, Chief, Western Utilization Research Branch, USDA, newly appointed member of the Foundation's Scientific Advisory Council, is secretary of the Task Group.

JOHN C. REILLY was recently appointed resident manager of the Tulsa Cold Storage Division, City Products Corporation. George L. Hancock will continue as assistant manager and comptroller.

OMAR JOHNSON has been appointed resident manager of the Federal Cold Storage Company, St. Louis, a division of City Products, replacing Col. R. C. Taylor, who has retired after 34 years of service.

ASRE Chapter Hears Talk Sound in Air Conditioning

A TALK on "Sound — A Design Factor in Air Conditioning" was given at the annual joint meeting of the American Society of Heating and Air Conditioning Engineers and American Society of Refrigerating Engineers January 15, in the Stewart hotel, Seattle, Wash.

The speaker was Carlyle M. Ashley, president of the ASRE. His talk was supplemented with a tape recording illustrating the principles involved.

TRRF Annual Meeting

THE ANNUAL meeting of The Refrigeration Research Foundation will be held at the Chalfonte-Haddon Hotel, Atlantic City, N.J. It will be opened Saturday, March 30 with a session of the Scientific Advisory Council at which all warehousemen will be welcomed. On Sunday, March 31, a membership meeting will be held, followed, April 1, with an all day session of the Scientific Advisory Council and the Board of Governors, and on April 2 with a meeting of the Executive Committee.

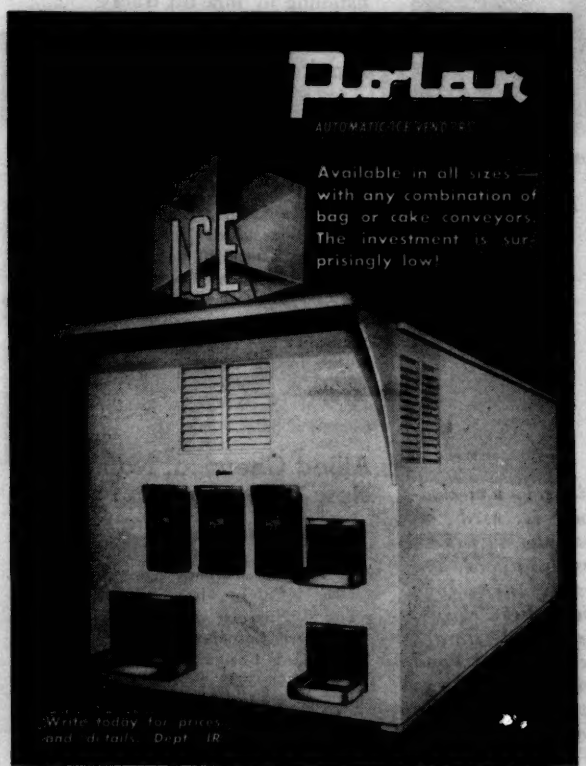
DEATHS

E. STANLEY MORGAN, owner of the Service Ice Co. and City Ice Delivery Huntington, W. Va., died January 17 of injuries received in an accident at the ice plant. He was 70. Mr. Morgan was a member of the Lions Club and Masonic Lodge in Oak Hill, Ohio.

HERMAN HAGER, Bloomfield, N.J., who operated the Hager Ice & Coal Co. for 20 years until he retired in 1949 died January 12. He was 74. He was born in Germany and came to this country in 1893 and had lived in Bloomfield 49 years.

PIERRE B. GIROUX, former general manager for National Harbor Cold Storage, Montreal, Que., died December 14. He was 81. He had been associated with Canada Packers for 30 years.

JOHN E. ARMOR, Denver, Colo., formerly operator of the old Armor Ice Co., died January 13, at St. Joseph's Hospital. He was 74. The ice company dissolved in 1944.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Large handwheel
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MANUFACTURERS' NEWS

Aluminum Clad Cold Storage Doors In New Miami Warehouse

THE first complete installation of aluminum-clad storage doors in this country has been made at the new Miami, Fla., warehouse of Food Fair Stores, Inc. According to Jamison Cold Storage Door Co., Hagerstown, Md., who supplied the doors, they represent the largest single installation of aluminum-clad doors in the country.

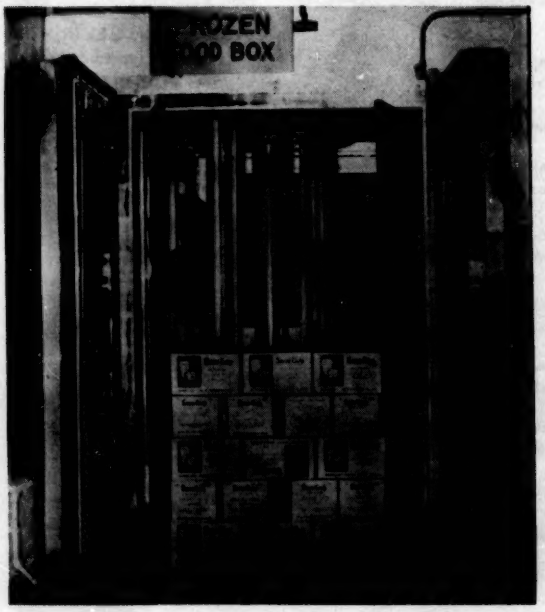
Principal advantage of the 16 and 26 gauge aluminum cladding is a savings in weight, an important factor since many of the doors are large double doors 6 by 8½ ft in size. The aluminum-clad doors are reported cheaper than stainless-clad doors but more expensive than galvanized steel-clad doors. They are regarded as highly durable.

There are 57 aluminum-clad doors of various types in the new warehouse. These are double super freezer doors, three small single doors, 23 large double doors, and 28 auto-close doors. All the doors are completely clad with aluminum, on both the fronts and backs. Others are additionally protected on the lower half with heavy gauge aluminum plate. The new doors, specified by the warehouse, are insulated with sheets of reflective aluminum in multiple layers.

Other advantages of the aluminum-clad doors include their clean and bright appearance; resistance to corrosion, staining, spotting and deterioration; simplicity in washing down and maintaining, and their contribution to refrigeration efficiency in preventing vapor penetration.

The warehouse, one of the most modern of its kind in the South, was built by Plaks Consrtuction Co., Miami, Fla., to facilitate palletized handling by fork lift trucks.

Overhead track is used to convey these sides of beef into cold storage chamber for meat at Food Fair Stores, Inc., warehouse in Miami, Fla. Both leaves of these double doors are aluminum-clad inside and out.



Aluminum cladding is used on both the outside double doors and inside auto-close doors at the Miami, Fla., cold storage warehouse of Food Fair Stores, Inc. Operator here is moving palletized load of orange juice concentrate from frozen food storage room.

Lawson Director of Marketing For Pennsalt

THE appointment of George R. Lawson as director of marketing of Pennsalt Chemicals' Industrial Division has been announced by General Manager Hugh C. Land. In this newly created position, Mr. Lawson will direct the combined sales organizations of the former Sharples and Industrial Chemicals Division which were recently consolidated in the formation of the Company's new Industrial Division.

Mr. Lawson joined the Pennsalt organization in 1946 and served successively in the former Sharples Division as Manager of its New York office, General Manager of Sales and Vice-President in Charge of Sales.

Allied Chemical Names New Sales Agents

TO HANDLE sales for Barrett Brand Anhydrous Ammonia in cylinders in central and southern Ohio, Merchants Chemical Co. Inc. has been appointed as agent by Nitrogen Division, Allied Chemical & Dye Corporation.

Merchants Chemical Company will stock cylinders at 2933 Spring Grove Avenue, Cincinnati and at 1795 South High Street, Columbus, Ohio.

Inland Chemical and Solvent Corporation, has been appointed as agent for cylinders in northwest Ohio. They will handle sales and maintain stock at 1147 Dorr Street, Toledo, Ohio.

Henry V. Heuser Elected President of Vogt Company

ON JANUARY 1 the third generation took over the helm of a 77-year old Louisville industrial equipment manufacturer, when Henry V. Heuser was elected president of the Henry Vogt Machine Co. He succeeds his father, G. A. Heuser, who becomes chairman of the board. Founded in 1880 as a little machine shop by the late Henry Vogt, President Heuser's grandfather, the Louisville company has grown steadily through the years to front rank in its field. The Louisville plant now spreads over 27 acres of production area.

Henry V. Heuser

Vogt Company principal products include forged steel valves and fittings, steam generators, and equipment for refineries and chemical plants; its market includes several foreign countries besides the United States. Sales offices are maintained in the principal cities of America.

The new president of the Vogt Company is a graduate chemical engineer, (Purdue University, 1936) and has worked in every department of the Vogt organization during the past 20 years. He has for several years been executive vice president, in which position he also was sales director.

New Concern to Supply Cold Storage Doors

THE FORMATION of a new company, Cold Storage Door and Supplies, Inc., with offices in the Produce Building, Los Angeles, has been announced by Gene Hunter, veteran of many years in refrigeration and related fields. Mr. Hunter heads the new organization which supplies doors for coolers and cold storage plants and warehouses. Prior to his present enterprise, Mr. Hunter was associated with Jamison Cold Storage Door Co. and Thermal Products Co., both of Los Angeles. Previously also he was field superintendent for Baker Ice Machine Co., and field engineer for Mills Novelty (now Mills Industries, Inc.) where he assisted in presenting the first Coca Cola bottle vending machine to the Coca Cola Bottlers Convention at Birmingham, Ala.

Brown Steps Up Production of Ice Vending Stations

A PRE-SEASON preview showing of the all new K. G. Brown 6 x 8 ft. automatic vending station, featuring the exclusive Brown invented vendor, dictated an all out production schedule for the unit. Tooling has now been completed and the Brown plant in Mattituck, Long Island, N.Y., is under full steam turning out stations to catch up with the heavy backlog. Vendor capacity of the unit is 80-10 lb. bags.

Baker Co. New Sales Representative for Hubbell

THE appointment of the H. W. Baker Company, 228 Seventh Street, San Francisco 3, California, as sales representative for Northern California and Reno, Nevada, is announced by The Hubbell Corporation, Mundelein, Ill., manufacturers of automatic back pressure regulators, solenoid valves for refrigeration, air-conditioning and industrial application. Baker will carry a representative stock of Hubbell controls and accessories as well as repair parts. Service and application assistance will be available in order to better serve the trade in this territory.

Worthington Will Market Rust Preventative

EXCLUSIVE rights have been received by Worthington Corp. from the Quaker Chemical Company to market its Ferricote 300 blend rust preventative in one quart cans. Worthington will sell the rust preventative exclusively through its distributors. Manufactured for indoor use only, the rust preventative is especially effective in preventing formation of rust on pump installations during shutdown periods. It can be sprayed or painted on parts, machine tools, hand tools, wrenches, or any metal surface which might rust during shut-down or storage. Small parts can be dipped in the solution.

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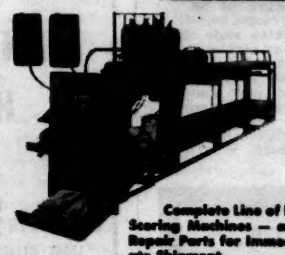

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(Illustrated 3/8" M. FL. x 3/8" FE. FL.)

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Price New Eastern Manager For Foamglas

John H. Price

THE appointment of John H. Price as Eastern Manager of Foamglas low temperature sales has been announced by Paul D. Japp, general sales manager of the Pittsburgh Corning Corp. He will be located at the company's Philadelphia district office in the Lewis Tower Building. He will assist distributors and PC field representatives in the sale of Foamglas in the low temperature field. A graduate of Western Maryland College, Mr. Price has been associated with the company since 1952 as a sales representative attached to the Philadelphia Office.

Union Lumber Expands

COMPLETION of the revamping of its dry shed facilities to facilitate mixed car shipments at its mills at Fort Bragg, California is announced by Union Lumber Company, producers of Nogo brand Redwood. According to Sherman A. Bishop, vice president in charge of sales, the step was taken to meet the increasing demand by retail dealers for mixed car shipments of the various Union Lumber Company products. A complete stock will be available for mixed car shipments.

Hydraline Products Consolidated with York

AN announcement from Borg-Warner Corp. states that it has consolidated its Hydraline Products Division in Detroit, Mich., with its recently acquired York Division in York, Pa. The two divisions manufacture related products. Hydraline produces forced-water air conditioning systems and recessed room heating, cooling, and air filtering units. York is a nationally-known manufacturer of air conditioning and refrigeration equipment.

Under the consolidation, York will expand its manufacturing program to include a new line of York-Hydraline air conditioning products. These will be marketed through the present Hydraline distribution system, serving primarily the plumbing and heating trade. These will be marketed through the present distributors.

New Engineering Concern

THE Insulation Engineering Corporation has been organized at El Monte, Calif. with officers at 9716 E. Rush Street. John M. Fenwick is president and Walter R. Martinez is vice-president and field representative. For four years Mr. Fenwick was the cold storage insulation estimator and salesman in Southern California for the Johns-Manville Sales Corporation. Mr. Martinez, has had a long background with both Johns-Manville and Armstrong Cork, where he supervised the installations of the insulation material.

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CATALOGS AND BULLETINS

Bulletin on Pipe Insulation

A BULLETIN of twelve pages in color covering the essentials pertaining to underground pipe conduit has been issued by the Port-Hayden Companies, Newark, N.J. It shows how Therm-O-Tile is constructed and installed. Takes care of both molded and filler insulation. How the piping is supported, anchored and guided. Shows the many arch diameters and base sizes. Double conduits for multiple pipes too large for a single conduit. Gives results of strength tests at the Pittsburgh Testing Laboratory. Therm-O-Tile is used wherever central or district heating is applicable, also for hot or cold oils or other fluids. Typical examples are pictured in this new bulletin.

Mercoid Issues Catalog of Automatic Controls

THE MERCOID CORPORATION has just released their latest catalog of automatic controls listing over 100 items. All controls feature hermetically sealed mercury contacts. Catalog lists controls for single stage pressure, two-stage pressure, differential pressure, single stage temperature, two-stage temperature, liquid level and mechanical movement. Also shown are relays and a complete line of mercury switches. Each control, with accompanying description, specifications and engineering data can be located by a dual index included in the catalog.

New Hubbell Catalog

RELEASE of their 25th Anniversary Catalog No. 57 is announced by The Hubbell Corporation, Mundelein, Ill. The new catalog is made up of seven distinct sections covering solenoid valves for all refrigerants from ⅛ to 8 inches in size; solenoid valves for water, gas, air and chemical from ⅛ to 8 inches; air, electric, and thermal compensating type back pressure regulators; miscellaneous section covering refrigerant globe valves, gauges, thermostats, glass water distributors and ice rink inserts; parts and operation data section; engineering section with many new tables and useful data.

Bulletin on Flooring

THE E. H. O'NEILL FLOORS COMPANY, 2525 South 50th Avenue, Cicero 50, Illinois, floor and wall coating specialists for more than half a century, has issued an informative engineering bulletin (44-H) on trowelled flooring over new and old construction: wood, concrete, metal and direct application to floor insulation. Special reference is made to "Packers' Fact-O-Crete" (an O'Neill product) formulated to meet specific requirements of meat and food processing rooms and plants.

Bulletin on Liquid Return Systems

A BULLETIN on liquid return systems for ammonia which should be of much interest to engineers and others has been issued by H. A. Phillips & Co., Chicago, Ill. The Phillips liquid return system is a "packaged" unit that fits most new or existing plants with minimum installation time and cost. It is recommended for handling medium "slop-over" conditions (up to 37 percent of plant capacity) where suction line accumulator is close to and above liquid ammonia receiver. This bulletin tells how the return system works, how to select the right accumulator size and much other useful information that should be of value to all those who make use of liquid return systems.

New Blower Folder

A NEW four-page folder has been issued by The General Blower Company, which features General's perfect circle turbo design. The brochure also includes a large number of blower items in the line and show several recent GB "Lungs for Industry" installations.

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New 1950 Model Y 40

2 YORK 11½ x 10, 2-cyl. with 100 ton capacity each. 175 H P synchronous motors with exciters mounted.

1 WORTHINGTON DUPLEX K.D.V. 4 x 4 ammonia pump. 5 H P AC, 30 G.P.M.

7 YORK EV 10A Economizers—10 H P, magnetic starters.

Note: All current AC 440/B/60

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Classified Advertising

USED EQUIPMENT—wanted & for sale

FOR SALE—1-8x8 ammonia compressor, also a 5 x 5, 4 x 4 and 3 x 3 units, and used motors. The Gus A. Regnier Refrigerating Engineering Co., 532 Winchester Ave., P.O. Box 1093, New Haven, Conn.

FOR SALE — Refrigeration equipment; ice equipment; new, used. Advise us your needs. Use "QUICKSEAL" — stops brine tank leaks; easy, efficient, economical. Born Company, 80 East Jackson Boulevard, Chicago 4, Illinois. WAbash 2-3299

FOR SALE—Two 10x10 York compressors operated with 175 h.p. synchronous motor, complete panel board. York 9x9, 7x7, 5x5, 4x4, Vilter 4x4. York blower, 3 ton; all priced very low. Gordon Equipment Co., 6530 W. Jefferson Ave., Detroit 17, Mich.

FOR SALE—4x4, 5x5, 8x8 Fricks, 5x5, 8x8 Yorks; 15 ton shell & tube condenser, 7½ and 9x9 York crank shafts. Write E. Niebling, 1546 St. Clair Ave., Mt. Healthy, Cincinnati 31, Ohio.

FOR SALE — ICE CANS, about 200. Size 11½ x 22½ x 44 inside. Good condition. Bargain price $4.00 each. Write Independent Ice Co., 3714 Commerce St., Dallas 26, Texas.

FOR SALE—AMMONIA—FREON
1—3-¾x3"—8 cyl. V/W York belt driven ammonia compressor.
1—5¼"x4¼"—6 cyl. V/W York ammonia booster comp.
1—6-¾"x5"—6 cyl. V/W York booster ammonia comp.
1—25 ton Chrysler Air Temp. Freon condensing unit, complete.
1—40 ton General Electric Freon condensing unit, complete.
1—50 ton General Electric Freon condensing unit, complete.
1—50 ton Buffalo Freon evaporative condenser.
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2—10"x10" 2 cyl. Frick D.C. to 100 hp motor.
2—10"x10" 2 cyl. York D.C. to 100 hp motor.
3—9"x9" 2 cyl. York D.C. to 75 hp motor.
1—8"x8" 2 cyl. Frick D.C. to 75 hp motor.
1—7¾"x5"Frick booster.
2—50 ton G.E. Freon condensing units.
1—50 ton Buffalo Freon evap. condenser.
1—6"x6" Frick compressor.
1—5"x5" York compressor.
3—9¼x14" 115 hp Wolverine Diesel engines.
11x22x47" and 11x22x51" ice cans.
Ice plant — 20 to 160 tons.
ENTERPRISE EQUIPMENT CORPORATION
77 Alexander St. Yonkers, N. Y.
Cable ENEQCO Phone: Yonkers 8-8118-9

FOR SALE— Mechanical equipment for 100 ton ice plant. 936 cans, two Vilter 13½x26 HDA, 100 r.p.m. d/c 150 h.p. 2500/4000 synchronous motors, MG sets, wood tank framing, 24 wide x 36 rows, 6 can crane, individual hooks, dip tub, can dump, filler. Coils between cans, 16,500 ft. 1¼" pipe. Two evaporative condensers 100 T.R. each. Will accept offers for all or part, where is as is, South San Francisco. Right reserved to reject all offers. Desire to dispose of equipment to free building for other use. Contact Pacific Fruit Express Company, 116 New Montgomery St., San Francisco 5, Calif. Attention E. F. Gaebler.

FOR SALE
10 x 10 York V Belt drive 100 h.p.
9x9 York direct connected to 75 h.p. motor.
10x7½ York & 8x6 York Model D-8 boosters.
7½x7½ York V Belt drive to 50 h.p. motor.
6x6, 5x5 & 4x4 York Model D-8 compressors.
5x5 & 4x4 York self-contained unit.
(2) 6' x 16" coded receivers w/valves.
Condensers, receivers, motors, etc.
JOHN F. CARSON
A & Venango Sts. Philadelphia 34, Pa.
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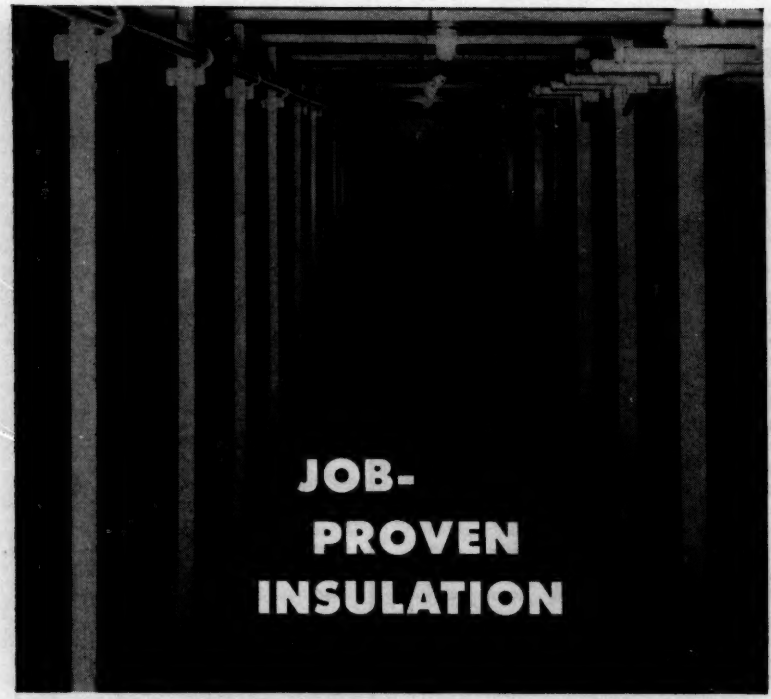

UNITED'S BB (block-baked) CORKBOARD

United's Corkboard has been the choice of hundreds of cold storage operators over the last forty years. Inspection of many United Cork installations after 10 to 20 years service has shown the insulation to be as good as new—no deterioration—no loss in insulating effectiveness.

Whether you operate an ice cream plant, creamery, food processing company or cold storage warehouse you can't take chances with your insulation—it has to be right. If you have a low temperature insulation problem, specify United's Corkboard—it's time-tested on the job.

Retains initial low "K" factor
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Works as easily as lumber
Lightweight and flexible
Structurally strong
Bonds readily with cement, hot or cold asphalt
Fire retardant; insect, vermin resistant

United Cork Companies have 50 years of experience and leadership in serving the requirements of the refrigeration industry. Use the coupon below for additional product information and installation data, your United representative will be glad to advise you.

Corkboard

Pipe Covering

Tank Lagging

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Manufacturers and erectors of cork insulation for almost a half century

Engineering and installation offices, or approved distributors, in key cities—coast to coast.

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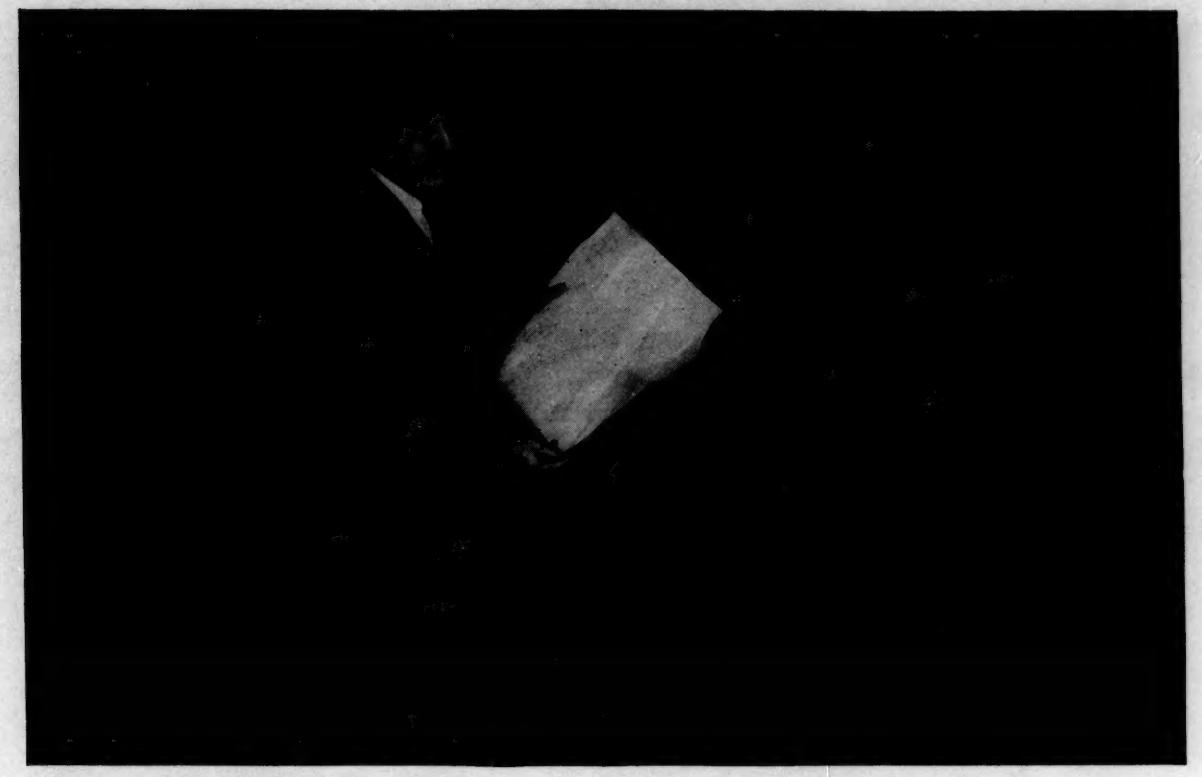
Take a tip from those who know refrigeration best!

"Impure ammonia means trouble"



M. W. Garland, Chief Engineer
Frick Company, Waynesboro, Penna.

"As an engineer, I'm familiar with what happens to compressor lubricants and highly finished parts of both compressors and automatic controls of modern refrigeration equipment if impure ammonia is used. It means trouble with a capital 'T'! Just a few hundredths of a percentage point of purity can mean the difference between fouled equipment and smooth-running machinery that is free of sludge, ice in evaporators or other foreign matter.

"That's why we charge all new refrigerating equipment with only the highest purity ammonia! And we strongly recommend that our customers do the same."

Do as so many leading manufacturers of refrigeration equipment do. Use only Armour 99.98% pure ammonia. It's extremely dry and free from all oil and non-condensable gases. Best of all—Armour has 155 cylinder stockpoints from coast-to-coast and 7 strategically located bulk stations—*more than any other manufacturer!* That's why those who know refrigeration best call on Armour for dependable, fast service.

ARMOUR *Ammonia Division*

SEND FOR FREE AMMONIA DETECTORS!

ARMOUR AND COMPANY R3
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- ☐ Send me *FREE* Sulphur Tapers and sensitive Test Papers for detecting ammonia leaks.
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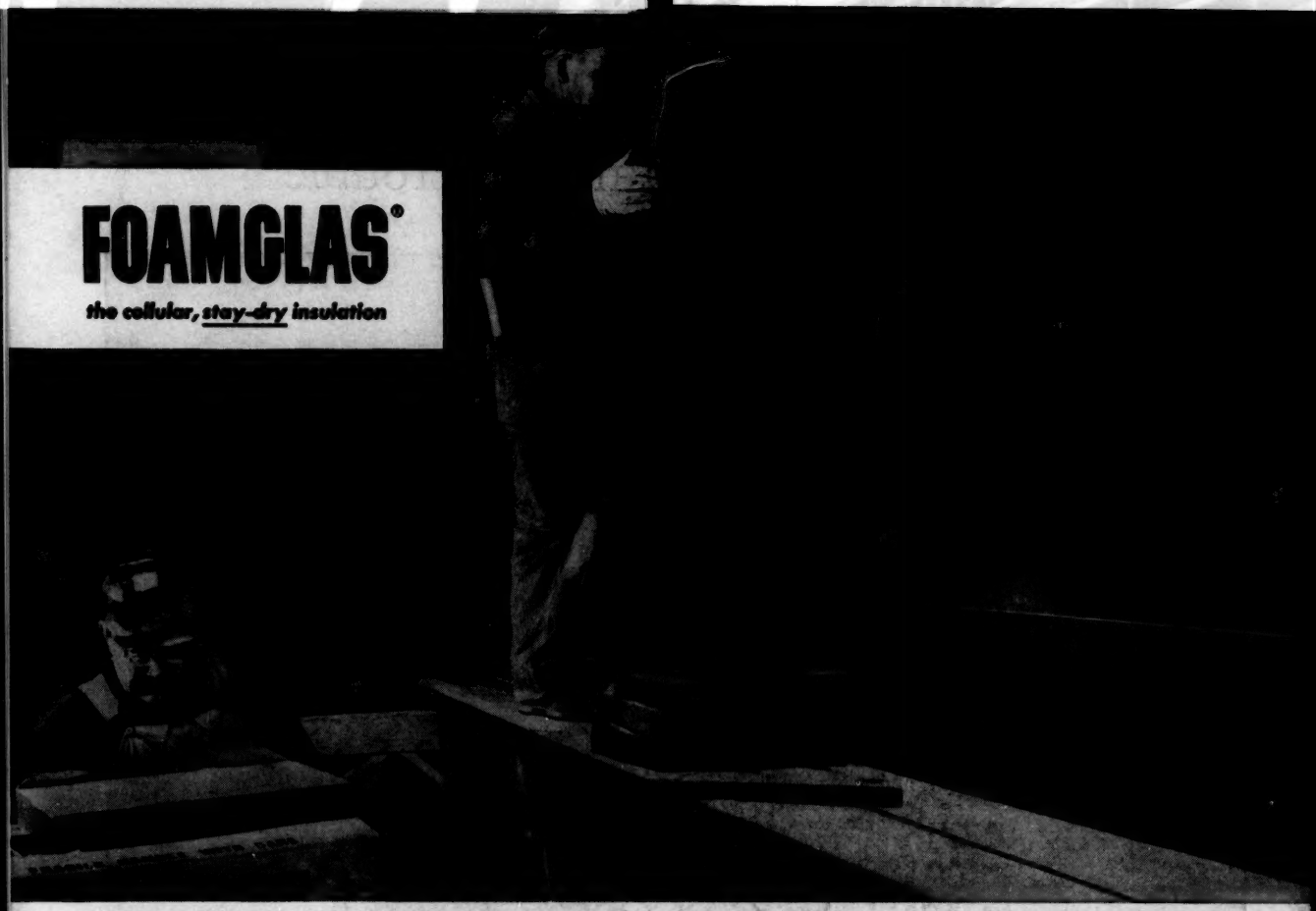

This multilayer application of 2" FOAMGLAS is at Food Fair's Linden, N. J., abattoir. In this and similar installations throughout their chain, Food Fair relies on moisture-proof FOAMGLAS to help protect food quality . . . by insuring constant, long-lasting insulating value for efficient refrigeration at low cost. Insulation Contractor: Waverly Builders, Inc., Hillside, New Jersey.

In stores and warehouses throughout their growing chain . . .

Food Fair depends on moisture-proof FOAMGLAS to keep insulating value up—refrigerating costs down

In ten short years, Food Fair Stores, Inc., Philadelphia, has grown from 89 stores and sales of $101 million to 237 stores and annual sales of nearly $475 million. Constant, careful attention to food quality has played a big role in that phenomenal growth. And Food Fair's use of *moisture-proof* FOAMGLAS for dependable insulation in refrigerated areas in their stores and warehouses reflects that attention to quality.

Food Fair has found that FOAMGLAS stands for constant insulating efficiency without the costly headache of insulation replacement. Its sealed cellular structure and all-glass composition make it an effective vapor barrier—sealing out the moisture that destroys efficiency of ordinary insulations. And the unique combination of FOAMGLAS strength and rigidity makes it an ideal structural material in many applications . . . even under floors where it can easily withstand loads of over seven tons per square foot.

In various applications throughout their chain, FOAMGLAS insulation for roofs, ceilings, corewalls, wall linings and floors gives Food Fair long-life insulating protection. That insures dependable, low cost refrigeration in such varied locations as an abattoir in Linden, N.J., a warehouse in Baltimore and supermarket cold rooms throughout the Baltimore-Philadelphia area. The excellent performance of FOAMGLAS in all these uses has led Food Fair to plan similar installations for their continuing expansion program.

Prove to yourself that *you*, too, can solve your insulating problems best with FOAMGLAS. Send today for a free sample and directions for six simple "desk top tests" that quickly demonstrate the valuable combination of qualities you get only with FOAMGLAS. Address . . .

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In Canada: 57 Bloor St. W., Toronto, Ontario

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With this test you can quickly prove to yourself the unique compressive strength of FOAMGLAS . . . which allowed Food Fair to use it even beneath load bearing floors. Send today for a FOAMGLAS sample and directions for six simple tests which demonstrate clearly its unique benefits.